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National Potato Germplasm Evaluation and Enhancement Report, 1989

Sixtieth Annual Report
by Cooperators

Compiled and Edited
by
Kathleen G. Haynes
Vegetable Laboratory
Beltsville Agricultural Research Center
Agricultural Research Service
U.S. Department of Agriculture
Beltsville, Maryland

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TABLE OF CONTENTS

UNITED STATES DEPARTMENT OF AGRICULTURE	1
K. G. Haynes, R. W. Goth, and D. R. Wilson	
USDA-Agricultural Research Service Western U.S.	37
J. J. Pavek and D.L. Corsini	
INTER-REGIONAL POTATO INTRODUCTION PROJECT (IR-1)	41
J. B. Bamberg and R. E. Hanneman, Jr.	
NORTH-CENTRAL REGIONAL POTATO TRIALS	46
R. H. Johansen and Cooperators	
WESTERN REGIONAL POTATO VARIETY TRIAL	59
J. J. Pavek, D. L. Corsini, and Cooperators	
CALIFORNIA	67
R. E. Voss, K. L. Brittan, J. Guerard, H. Carlson, R. Johansen, and J. Pavek	
COLORADO	77
D. G. Holm	
FLORIDA	83
J. R. Shumaker, D. P. Weingartner, and Steve Molnar	
IDAHO	91
S. Love, A. Thompson, J. Pavek, and D. Corsini	
LOUISIANA	99
J. F. Fontenot, G. Shaver, P. W. Wilson, W. A. Young, and W. A. Meadows	
MAINE	
G. A. Porter, J. A. Sisson, and M. Buck	104
A. G. Reeves, R. B. Long, G. S. Grounds, R. A. Henn, A. A. Davis	118
MICHIGAN	
R. W. Chase, G. H. Silva, D. S. Douches,	122
R. B. Kitchen, and R. Hammerschmidt	
D. S. Douches, R. W. Chase, R. Hammerschmidt,.	134
G. Silva, and J. Cash	
D. Douches, R. Hammerschmidt, K. Ludlam, R. Chase, . .	136
and C. Wallace	
NEW YORK (LONG ISLAND)	141
J. B. Sieczka, D. D. Moyer, J. M. Kossowski, and R. C. Neese	

NEW YORK (UPSTATE)	
D. E. Halseth and W. L. Hymes	159
R. L. Plaisted, B. B. Brodie, R. Loria, and W. M. Tingey	177
NORTH CAROLINA	180
M. J. Wannamaker and W. W. Collins	
NORTH DAKOTA	188
R. H. Johansen, B. Farnsworth, and D. Peterson	
OHIO	199
M. A. Bennet, A. D. Bisges, E. M. Grassbaugh D. M. Kelly, M. D. Kleinhenz, F. I. Lower, R. C. Rowe, K. L. Wiese, and E. C. Wittmeyer	
OREGON	220
A. Mosley, D. Hane, S. James, C. Stranger, and K. Rykbost	
TEXAS	230
J. C. Miller, Jr., and D. C. Smallwood	
VIRGINIA	239
S. B. Sterrett and C. P. Savage, Jr.	
WISCONSIN	247
R. E. Hanneman, D. M. Spooner, and J. B. Bamberg	

UNITED STATES DEPARTMENT OF AGRICULTURE
BELTSVILLE AGRICULTURAL RESEARCH CENTER (BARC), BELTSVILLE,
MARYLAND, AND CHAPMAN, ECHO LAKE, AND AROOSTOOK FARMS,
PRESQUE ISLE, MAINE

K. G. Haynes, R. W. Goth and D. R. Wilson

BARC

OBJECTIVES: The USDA potato breeding program at Beltsville has three main objectives: (1) to develop improved pest-resistant germplasm lines and varieties; (2) to develop improved germplasm lines and varieties for processing directly out of cold storage; and (3) to enhance germplasm for specific characteristics relating to pest resistance, yield, environmental stress, human nutrition and consumer acceptance.

BREEDING: Hybridizations in the greenhouse at BARC were made among clonal material possessing late blight, Verticillium, scab, and soft rot resistance; high quality; processing and fresh market potential; different skin types; and adaptability to various ecological test zones. Three hundred and sixteen crosses were successful. Approximately 22,700 seedling tubers were produced from 101 parental combinations; 83 of these combinations were grown on Chapman for varietal evaluation, 12 were grown on Aroostook Farms for early blight evaluations, and 6 were grown on Chapman for soft rot evaluation. In addition, approximately 7,000 seedlings from a diploid population were grown on Chapman. "B" seedling tubers were sent to North Carolina and Colorado. Seedling tubers from two crosses were sent to Dr. Monty Harrison, Colorado, for evaluation for ring rot.

Presque Isle, Maine

CHAPMAN FARM: Of the approximately 29,700 seedling tubers planted, 785 were saved for further evaluation in 12-hill plots in 1990; 1,200 were saved for a study on specific gravity; 130 were saved for further evaluation for early blight resistance, 502 were saved for evaluation for soft rot resistance and within the diploid population, 288 were saved for further evaluation. Of the 1,248 clones evaluated in 12-hill plots, 321 were saved for evaluation in 40-hill plots in 1990. Of the 306 clones evaluated in 20-hill plots, 141 were saved for evaluation in 60-hill plots in 1990. Of the 85 clones evaluated in 60-hill plots, 54 were saved for evaluation in 80-hill plots in 1990. Of the 25 clones evaluated in 80-hill plots, 14 were saved for evaluation in 100-hill plots in 1990. Of the 65 clones evaluated in 100-hill plots, 47 were saved for evaluation in 150-hill plots in 1990. Of the 94 clones evaluated in 150-hill plots, 86 were saved for evaluation in 200-hill plots in 1990. Of the 30 clones evaluated in 200-hill plots, 14 were saved for further evaluation in 200-hill plots in 1990, and the decision was made to seek to release one, B9792-157, as Coastal Chip.

All index materials planted on Chapman were done in tuber units with six feet between rows and five feet between units to continue the virus/viroid indexing program. All clones in the 60-hill plots had an index planting of three 4-cuts, the 80-hill plots had an index planting of four 4-cuts, the 100-hill plots had an index planting of five 4-cuts, the 150-hill plots had an index planting of six 4-cuts, and the 200-hill plots had an index planting of seven 4-cuts. With this increase in the index planting, we hope to be able to plant the increase plots completely from indexed material in the future. Thus, material distributed to cooperators should be relatively free of viral contamination.

Seed tubers of promising clones and standard varieties were distributed for adaptability and/or processing trials and/or preliminary evaluation to Maine, New York (Upstate and Long Island), New Jersey, Pennsylvania, Virginia, North Carolina, Georgia, Florida, Michigan, Ohio, California, and Colorado. All seed tubers of promising clones now come from Chapman Farm. The Echo Lake Farm has been devoted exclusively to yield trials.

ECHO LAKE: Round white and russet yield trials (Tables 1-10) were planted in a randomized complete block design with four replications at Echo Lake from 18-19 May. Round white and russet plots consisted of 25 hills per plot. Plants were spaced 9 inches within the row. At harvest tubers from each plot were graded, specific gravity was determined by the weight in air and water method, the five largest tubers were cut to determine the presence of hollow heart (20 tuber sample per clone), and tuber samples were stored at 40°F, 45°F, and 50°F. Samples were processed out of 40°F, 45°F, 50°F and a three week 70°F reconditioning period out of 40°F storage during January, February and March. Tubers from the round white yield trials were not processed at 50°F in March. For each combination of storage temperature and processing date, ten tubers per sample from each plot were cooked.

Potato chips were made from each round white sample by taking 1/16-inch slices from cross and lengthwise sections of each tuber. Lengthwise chips were used to detect possible increase in reducing sugars, particularly near the stem end. Slices were rinsed in water and placed on paper towels to remove excess moisture. Chips were then fried at 340°F in Primex vegetable shortening until bubbling ceased.

Russet types were processed into french fries. A 3/8-inch diameter plug was cut from the cross and lengthwise sections of each tuber, washed, dried, and fried at 360°F for five minutes.

Each potato chip and french fry was classified after frying into color classes. Chip classes ranged from 1=very light to 10=very dark. French fry classes ranged from 1=very light to

5=very dark. Weighted averages were calculated by multiplying the number of chips or french fries in each color class by the color class, totaled, and divided by the number of chips or french fries in each sample. Color ratings were made by using the PCII reference color chart 1206-U.

In addition to the round white and russet yield trials, a small farms/specialty market type yield trial was conducted this year (Table 11). This included red and purple skinned potatoes as well as yellow flesh. These were planted in a randomized complete block design with three replications on 19 May. Plots consisted of ten hills. Within the row, plants were spaced at nine inches. At harvest tubers from each plot were graded and specific gravity was determined. Samples were processed out of 40°F, 45°F, 50°F and a three week 70°F reconditioning period out of 40°F storage in January. Processing was done as for the round white trials described above.

AROOSTOOK FARM: Preliminary and advanced trials were conducted on breeding clones and varieties for resistance to late blight, scab, Verticillium wilt, pinkeye, leafroll and Rhizoctonia. The scab test begun in 1988 in cooperation with Dr. Robert Young in West Virginia was continued. The study on the interaction of V. dahliae and V. albo-atrum begun in 1988 was concluded this year. Dr. Simeon Leach of Maine continued to evaluate some of our germplasm for resistance to Fusarium and Rhizoctonia.

BARC

TISSUE CULTURE: From May to June, 1989 all stocks in the tissue culture room were increased and tested for the presence of PVS, PVX, PVY, PVM, PVA, leafroll and spindle tuber viroid. Table 12 lists the collection of both American and foreign varieties that have tested negative for these diseases. These varieties are available to any researcher. Please furnish shipping instructions when you make a request for any of this material.

SUMMARY: Research is progressing on all three objectives in the potato breeding program. Genetic studies are in progress on the inheritance of resistance to Verticillium, scab, and PVS. Advanced germplasm is routinely screened for its reaction to several important diseases.

The most advanced germplasm is now evaluated in yield trials and processed in January, February and March. Several clones seem to have the potential to process directly out of cold storage or after reconditioning: B9935-10, B0237-1, B0237-6, B0239-20 and B0245-15. A decision was made to seek the release of B9792-157 as 'Coastal Chip'. This release should be forthcoming early in 1990.

BARC Table 1. Yield, tuber size distribution, and quality characteristics of round whites harvested 121 days after planting at Echo Lake in 1989.

Pedigree	Mkt CWT/A	% Mkt	Tuber size distribution						S.G. ¹	H.H. ²		
			1-7/8" 2-1/4"		2-1/4"- 3-1/4"		3-1/4"					
			1-7/8" 2-1/4"	2-1/4"- 3-1/4"	2-1/4"- 3-1/4"	> 4"	> 4"	> 4"				
Atlantic	394	91	1.9	12.2	47.5	31.0	7.4	83	5			
B0034-10	314	90	9.6	38.1	48.4	3.9	0.0	86	4			
B0172-12	316	92	2.7	10.4	50.4	31.0	5.5	75	7			
B0172-15	358	72	7.3	2.8	34.5	34.3	21.1	78	5			
B0172-22	347	94	1.9	12.1	53.5	28.4	4.1	82	12			
B0174-11	255	94	3.4	15.8	55.7	22.5	2.6	82	1			
B0174-16	317	93	5.5	26.2	63.4	3.8	1.1	91	2			
B0175-20	386	93	2.0	10.9	49.9	31.8	5.3	83	15			
B0175-21	301	95	1.0	9.3	55.7	29.8	4.1	89	2			
B9792-158	383	92	3.6	16.4	48.2	27.6	4.3	76	10			
B9792-61	260	95	2.6	17.6	58.8	18.4	2.5	79	0			
B9935-10	289	91	1.7	8.3	49.0	34.0	7.0	70	1			
B9955-11	295	94	6.0	25.3	59.9	8.8	0.0	85	0			
B9955-33	285	92	3.3	15.9	50.2	26.3	4.4	78	0			
B9955-46	312	91	3.2	12.0	47.7	31.1	6.0	70	0			
Coastal Chip	310	92	2.1	13.0	54.0	24.8	6.0	77	4			
Monona	288	86	2.9	12.5	48.3	25.0	11.3	67	3			
Norchip	403	96	3.9	25.0	61.5	9.6	0.0	77	0			
LSD (.05)												

¹1.0 Omitted

²Number of tubers with hollow heart out of the largest 20 cut.

BARC Table 1 (continued).

Pedigree	Temperature	50°F		45°F		40°F		40°-70°F		50°F		45°F	
		Date	1-16	1-22	1-19	1-29	2-7	2-13	Chip Spt				
Atlantic		8.5	M	9.0	S	9.5	S	7.1	M	8.6	L	8.9	M
B0034-10		5.9	M	7.0	M	7.7	S	6.5	M	7.0	L	6.8	M
B0172-12		6.2	M	7.5	S	8.4	S	7.1	S	6.8	M	7.8	M
B0172-15		7.6	S	7.8	S	8.6	S	8.6	S	7.2	S	7.6	M
B0172-22		7.1	M	8.3	M	8.5	S	6.9	S	7.1	M	8.4	M
B0174-11		7.0	M	7.9	M	8.7	S	7.5	S	7.4	L	7.7	M
B0174-16		7.5	M	8.2	M	8.8	S	8.1	S	7.6	M	8.8	M
B0175-20		7.7	S	8.0	S	8.9	S	7.7	S	7.8	M	7.9	M
B0175-21		7.5	M	8.2	S	9.1	S	7.4	M	7.5	VL	8.0	L
B9792-158		6.9	L	7.4	M	8.7	S	6.9	M	7.0	VL	8.1	VL
B9792-61		6.3	VL	6.6	M	7.8	S	6.7	M	7.0	VL	7.2	L
B9935-10		6.6	S	7.3	S	7.9	S	6.7	S	6.9	M	7.0	S
B9955-11		6.3	M	7.1	M	8.3	S	6.5	S	6.9	L	7.0	L
B9955-33		6.2	M	7.2	M	7.6	S	6.7	S	6.6	VL	7.1	L
B9955-46		6.7	M	7.6	N	8.1	S	7.0	S	7.3	VL	7.1	L
Coastal Chip		6.9	L	7.0	M	8.2	S	6.5	M	7.0	VL	7.0	L
Monona		6.6	M	8.0	S	8.2	O	7.0	S	6.9	M	7.7	M
Norchip		7.8	M	8.2	S	8.3	S	7.1	S	7.9	M	8.3	M

³Chips: 1-7 satisfactory

⁴Sprout length: O = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 1 (continued).

Pedigree	Temperature	40° F		40°-70° F		45° F		40° F		40°-70° F	
		Date	Chip Spt	2-20	Chip Spt	2-27	3-5	Chip Spt	3-8	Chip Spt	3-26
Atlantic		9.6	S	8.0	L	9.4	VL	9.6	M	8.1	M
B0034-10		8.0	M	7.6	M	7.9	L	8.0	M	7.1	M
B0172-12		8.6	S	8.3	S	8.2	M	9.0	M	8.0	S
B0172-15		8.8	S	7.9	M	8.2	L	8.2	S	7.4	M
B0172-22		9.1	S	7.9	S	8.4	L	9.3	L	8.2	S
B0174-11		8.9	S	8.1	M	7.7	L	8.8	L	8.0	M
B0174-16		8.7	S	8.3	S	8.5	L	9.3	M	8.2	L
B0175-20		8.9	S	8.3	M	8.8	M	8.8	M	8.0	M
B0175-21		8.8	S	7.4	M	8.4	VL	9.0	L	8.0	L
B9792-158		8.5	M	7.8	VL	8.1	VL	8.6	VL	7.8	L
B9792-61		7.9	M	7.6	VL	8.0	VL	8.4	L	8.1	VL
B9935-10		7.3	S	7.4	M	7.2	M	8.2	M	6.9	M
B9955-11		8.4	M	7.4	M	8.0	L	8.3	VL	7.8	L
B9955-33		7.5	M	7.5	M	7.9	VL	7.9	L	7.6	M
B9955-46		7.7	M	7.7	L	8.1	VL	8.1	L	7.8	VL
Coastal Chip		7.7	S	7.4	M	7.6	VL	8.1	VL	7.2	L
Monona		7.9	S	7.2	S	8.0	L	8.3	M	7.3	M
Norchip		8.9	S	7.8	S	8.4	L	9.1	M	8.0	M

BARC Table 2. Yield, tuber size distribution, and quality characteristics of round whites harvested 121 days after planting at Echo Lake in 1989.

Pedigree	Mkt CWT/A	%	Mkt %	Tuber size distribution						S.G. 1	H.H. ²
				<1-7/8"	2-1/4"	1-7/8-	2-1/4"	3-1/4"	-4"		
Atlantic	34.5	88	3.9	13.1	46.5	28.7	7.7	7.7	7		
B0176-24	32.3	90	6.0	24.7	55.5	9.9	3.9	7.7	7		
B0177-11	14.0	88	11.8	47.4	37.1	3.8	0.0	76	0		
B0178-16	29.8	93	5.4	18.2	52.2	22.6	1.7	87	1		
B0178-30	28.3	96	2.6	19.0	54.1	22.9	1.4	78	5		
B0178-34	31.7	88	3.6	15.2	51.8	21.5	7.9	81	2		
B0178-41	15.8	82	17.9	44.5	35.0	2.5	0.0	84	0		
B0179-1	20.2	87	11.3	28.6	50.3	7.9	1.9	77	4		
B0179-17	33.6	80	4.4	7.7	42.9	29.7	15.3	78	9		
B0179-18	26.2	88	4.3	12.0	48.2	27.8	7.7	75	1		
B0179-19	31.9	92	8.3	30.7	52.6	8.5	0.0	92	12		
B0179-3	23.4	83	16.6	43.5	37.2	2.7	0.0	84	1		
B0179-6	25.3	89	11.2	33.0	50.5	5.2	0.0	80	2		
B0180-36	37.8	87	7.8	23.7	48.0	15.3	5.2	77	4		
B0183-25	34.1	87	7.9	21.7	51.3	14.0	5.0	72	5		
B0202-4	36.9	92	4.1	18.0	51.5	22.3	4.1	77	3		
Monona	26.4	91	3.3	13.8	52.7	24.6	5.6	67	0		
Norchip	26.2	89	11.0	36.0	47.8	5.2	0.0	72	0		
LSD (.05)											

¹1.0 Omitted.

²Number of tubers with hollow heart out of the largest 20 cut.

BARC Table 2 (continued).

Pedigree	Temperature Date	50° F		45° F		40° F		40°-70° F		50° F		45° F	
		1-16	1-28	2-2	2-29	Chip Spt	Chip Spt	Chip Spt	Chip Spt	2-7	2-13	2-7	2-13
Atlantic		8.4	M	9.0	S	9.2	S	7.6	S	8.8	L	9.5	M
B0176-24		7.8	M	8.5	S	9.3	S	7.7	S	8.1	M	8.9	M
B0177-11		7.7	L	8.3	M	9.6	S	7.9	M	8.0	VL	8.5	L
B0178-16		6.3	M	7.9	S	8.7	S	6.7	S	7.3	M	8.0	M
B0178-30		8.1	VL	8.7	L	9.4	M	7.7	M	8.6	VL	9.1	VL
B0178-34		6.2	S	7.5	S	8.2	S	6.5	S	7.1	M	7.8	M
B0178-41		7.4	M	8.2	M	9.4	S	7.7	S	7.9	L	8.9	L
B0179-1		7.5	L	8.4	M	8.7	S	7.2	S	8.1	VL	8.4	VL
B0179-17		8.1	M	8.2	S	9.2	S	7.5	S	7.8	L	8.7	L
B0179-18		8.2	L	8.8	M	9.3	S	7.7	S	8.7	VL	8.5	L
B0179-19		7.8	L	8.6	M	8.7	M	7.9	M	8.6	VL	9.3	VL
B0179-3		6.6	L	7.3	L	8.0	M	6.8	M	7.1	VL	7.2	VL
B0179-6		6.9	L	7.7	L	8.4	M	7.7	S	7.1	VL	7.4	VL
B0180-36		8.1	M	8.1	M	8.7	S	7.8	M	7.7	L	8.7	M
B0183-25		8.6	M	9.4	S	9.8	S	8.9	S	9.2	L	9.6	M
B0202-4		7.4	M	8.2	S	9.3	S	8.0	S	7.7	M	8.8	M
Monona		7.1	M	7.2	M	8.1	S	6.9	S	7.1	M	8.0	M
Norchip		7.5	S	8.2	S	8.8	S	7.2	S	8.0	M	8.4	M

³ Chips: 1-7 Satisfactory
⁴ Sprout length: 0 = no sprouts

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 2 (continued).

Pedigree	Temperature Date	40° F		40°-70° F		45° F		40° F		40°-70° F	
		2-21	Chip Spt	2-27	Chip Spt	3-5	Chip Spt	3-9	Chip Spt	3-27	Chip Spt
Atlantic		9.6	S	8.2	M	9.6	VL	9.7	L	8.7	M
B0176-24		9.2	S	8.8	S	8.6	M	9.2	M	8.8	S
B0177-11		8.9	S	7.9	M	8.7	L	9.5	M	9.0	M
B0178-16		8.5	S	7.4	M	8.7	M	8.8	M	8.3	S
B0178-30		9.5	L	8.7	VL	9.4	VL	9.6	VL	8.6	L
B0178-34		8.6	S	7.1	S	7.5	L	8.7	M	7.4	M
B0178-41		9.1	M	8.5	M	9.0	L	9.2	L	8.4	M
B0179-1		9.0	L	8.2	M	8.9	VL	9.4	VL	8.8	M
B0179-17		9.3	S	8.5	S	8.4	VL	9.2	M	8.6	M
B0179-18		9.3	M	8.1	S	8.6	L	9.4	M	8.1	M
B0179-19		9.3	L	8.4	VL	9.0	VL	9.5	VL	8.8	L
B0179-3		8.4	L	7.5	VL	8.2	VL	8.1	VL	7.4	L
B0179-6		8.7	L	7.5	L	8.3	VL	8.9	VL	7.8	L
B0180-36		8.8	S	8.2	M	9.0	M	8.6	M	8.8	M
B0183-25		9.8	S	9.5	M	9.7	L	9.9	M	9.7	M
B0202-4		9.2	M	8.5	M	9.1	M	9.5	L	9.2	S
Monona		8.5	S	7.4	S	7.7	L	8.6	M	7.5	S
Norchip		8.8	S	7.5	S	8.6	M	9.1	M	8.2	M

Table 3. Yield, tuber size distribution, and quality characteristics of round whites harvested 121 days after planting at Echo Lake in 1989.

Pedigree	Mkt Cwt/A	% Mkt	Tuber size distribution						S.G. ¹	H.H. ²	
			< 1-7/8"		1-7/8"- 2-1/4"		2-1/4"- 3-1/4"				
			1-7/8"- 2-1/4"	3-1/4"	-4"	-4"	> 4"				
Atlantic	325	87	4.0	15.6	41.9	29.1	9.4	76	6		
B0203-21	358	88	2.9	11.0	45.9	30.9	9.3	72	1		
B0209-1	341	76	1.7	5.9	31.0	39.0	22.5	74	2		
B0214-9	208	88	5.2	20.9	47.3	19.7	6.9	66	1		
B0233-1	311	75	3.6	7.3	35.8	32.1	21.2	72	2		
B0234-4	339	89	6.1	19.8	40.8	28.2	5.1	74	19		
B0234-7	265	93	5.2	18.1	55.9	19.0	1.8	70	1		
B0234-8	309	80	1.7	7.9	39.9	32.0	18.5	79	11		
B0237-1	273	94	6.4	26.7	53.5	13.4	0.0	75	2		
B0237-6	250	90	7.3	25.1	49.6	15.0	3.1	76	1		
B0237-9	304	92	4.6	20.4	52.2	19.6	3.2	73	0		
B0238-4	297	89	5.0	19.2	49.0	21.3	5.5	76	3		
B0239-20	287	85	2.8	10.1	42.9	32.4	11.9	71	4		
B0240-11	374	88	6.0	18.5	50.0	19.9	5.5	75	11		
B0241-7	183	90	10.4	33.7	50.9	5.1	0.0	72	1		
B0241-8	383	90	3.2	15.3	41.2	33.5	6.8	73	8		
Kennebec	375	75	4.4	10.9	41.5	22.7	20.5	72	6		
Superior	280	86	2.8	19.3	44.5	21.9	11.5	69	0		
LSD (.05)		56									

¹11.0 Omitted

²Number of tubers with hollow heart out of the largest 20 cut

BARC Table 3 (continued).

Pedigree	Temperature	50° F		45° F		40° F		40° - 70° F		50° F		45° F	
		Date	1-16 Chip ³	Spt ⁴	1-22 Chip Spt	2-2 Chip Spt	1-31 Chip Spt	2-8 Chip Spt	2-14 Chip Spt	2-8 Chip Spt	50° F	45° F	
Atlantic		8.2	M	9.2	S	9.9	S	8.2	M	9.1	L	9.1	M
B0203-21		8.0	M	9.3	S	9.6	S	7.9	M	8.9	L	9.4	M
B0209-1		7.9	M	8.1	M	9.4	S	7.8	S	8.0	M	8.6	M
B0214-9		7.2	M	8.6	S	9.2	S	7.9	S	7.3	M	8.2	M
B0233-1		8.1	M	8.9	S	9.6	S	7.8	M	8.6	M	9.1	M
B0234-4		7.0	M	7.4	S	8.4	S	6.3	M	7.2	VL	7.8	L
B0234-7		6.1	L	7.0	M	7.9	M	7.0	S	7.0	VL	7.4	L
B0234-8		6.7	L	7.9	S	8.6	S	6.7	M	7.3	VL	7.8	M
B0237-1		6.7	M	8.0	M	9.1	S	6.9	M	7.5	L	8.0	M
B0237-6		6.2	M	6.7	M	7.5	S	6.6	M	6.5	L	6.9	L
B0237-9		7.5	VL	8.3	M	9.5	S	7.6	L	8.4	VL	8.2	VL
B0238-4		7.8	M	8.8	S	9.5	S	9.0	M	8.0	M	9.0	M
B0239-20		7.0	M	8.1	S	8.7	S	7.2	S	7.6	M	7.4	M
B0240-11		6.9	M	8.3	S	9.5	S	7.9	S	7.6	M	8.3	S
B0241-7		6.7	S	7.3	S	8.1	S	7.1	M	7.3	M	7.2	M
B0241-8		8.7	S	9.1	S	9.8	S	8.3	S	8.7	M	9.1	S
Kennebec		8.2	S	9.0	S	9.4	S	8.5	S	9.0	M	9.5	S
Superior		8.3	L	9.2	M	9.9	S	8.4	M	9.0	VL	9.4	L

³ Chips: 1-7 satisfactory
⁴ Sprout length: 0 = no sprouts

S = < 0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = > 2.5"

BARC Table 3 (continued).

Pedigree	Temperature Date	40° F		40°-70° F		45° F		40° F		40°-70° F	
		Chip	Spt	2-21	2-28	3-5	3-9	Chip	Spt	Chip	Spt
Atlantic	9.8	S	8.4	L		9.6	L	9.8	M	8.6	M
B0203-21	9.7	S	7.9	M		9.6	L	9.2	M	8.5	M
B0209-1	8.9	S	8.5	M		8.6	L	8.9	M	8.4	S
B0214-9	9.2	S	8.1	M		8.6	L	9.0	S	8.4	S
B0233-1	9.3	O	8.7	S		9.1	VL	9.6	S	8.2	S
B0234-4	8.7	S	7.4	M		8.2	VL	8.4	L	7.6	M
B0234-7	7.4	L	7.3	L		7.4	VL	7.4	VL	7.2	M
B0234-8	8.6	S	7.6	M		8.3	M	8.1	M	7.5	M
B0237-1	8.9	M	7.3	M		8.3	L	8.8	M	7.5	S
B0237-6	7.4	S	7.3	L		7.2	VL	8.0	L	7.2	M
B0237-9	9.1	M	8.5	VL		8.6	VL	9.2	VL	8.9	L
B0238-4	9.2	M	8.7	S		8.8	M	9.3	M	9.4	S
B0239-20	8.2	S	7.1	S		8.2	M	8.6	M	7.4	S
B0240-11	8.9	S	7.3	M		8.4	M	8.6	M	8.1	S
B0241-7	8.2	S	7.6	M		8.0	M	8.1	M	7.7	M
B0241-8	9.5	S	8.2	S		9.3	M	9.5	M	8.8	S
Kennebec Superior	9.5	S	9.0	S		9.7	M	9.4	M	9.2	S
	9.4	S	8.4	M		9.6	L	9.7	L	9.2	M

BARC Table 4. Yield, tuber size distribution, and quality characteristics of round whites harvested 121 days after planting at Echo Lake in 1989.

Pedigree	Mkt CWT/A	%	Tuber size distribution						S.G. ¹	H.H. ²	
			Mkt	< 1-7/8"	2-1/4"	1-7/8-	2-1/4"	3-1/4"	-4"	> 4"	
Atlantic	403	86	2.0	10.2	42.0	33.3	12.5	84			
B0242-2	347	92	4.1	14.7	50.9	26.7	3.7	65			0
B0242-3	371	93	2.8	10.7	46.8	35.6	4.1	74			1
B0242-31	288	93	7.1	25.5	54.7	12.7	0.0	77			1
B0243-10	408	88	3.1	9.8	41.1	37.5	8.5	75			7
B0243-11	324	84	3.4	9.7	36.5	37.8	12.6	66			3
B0243-18	341	84	2.9	9.7	42.2	31.7	13.5	69			3
B0243-20	331	96	2.2	12.6	54.7	28.5	2.1	78			1
B0243-7	316	95	4.3	18.0	62.5	14.4	0.8	74			2
B0245-15	252	71	1.3	4.0	32.8	34.1	27.9	77			7
B0245-8	335	80	1.4	4.7	32.8	42.6	18.5	76			19
B0246-6	370	93	2.6	11.8	49.3	31.7	4.5	75			0
B0246-8	336	92	6.9	28.9	55.2	8.2	0.8	80			0
B0251-5	356	90	9.1	32.4	51.5	6.4	0.6	79			0
B0256-1	412	91	2.0	10.5	49.2	31.0	7.3	82			0
B0257-3	380	90	10.0	32.5	47.1	10.5	0.0	84			4
Kennebec	433	84	2.8	9.9	46.9	26.9	13.5	76			8
Superior	329	91	4.1	13.7	51.3	26.2	4.8	75			0

LSD (.05) 59

11.0 Omitted

²Number of tubers with hollow heart out of the largest 20 cut.

BARC Table 4 (continued).

Pedigree	Temperature	50° F		45° F		40° F		40°-70° F		50° F		45° F	
		Date	1-17	1-22	2-2	2-1	2-8	Chip Spt	Chip Spt	Chip Spt	Chip Spt	Chip Spt	Chip Spt
Atlantic		8.6	M	9.0	S	9.1	S	7.4	M	8.4	VL	8.8	L
B0242-2		6.7	L	7.2	L	7.9	S	7.4	M	6.9	L	6.7	L
B0242-3		6.6	M	7.3	S	7.7	S	7.0	M	7.3	M	6.8	L
B0242-31		8.0	M	8.2	M	8.6	S	7.8	M	7.8	L	7.6	M
B0243-10		7.8	M	8.6	S	9.5	S	7.1	S	8.0	M	8.5	M
B0243-11		7.5	VL	8.2	M	8.6	S	7.6	L	8.1	VL	7.9	VL
B0243-18		6.7	M	7.8	M	8.2	S	6.4	M	7.4	VL	7.0	L
B0243-20		7.5	L	8.2	L	9.0	M	7.0	L	7.8	VL	8.2	VL
B0243-7		7.1	L	8.2	L	9.1	M	7.8	M	7.4	L	7.7	VL
B0245-15		6.3	O	7.3	O	7.8	S	7.1	S	6.8	O	6.9	O
B0245-8		7.9	S	8.4	S	8.9	S	7.2	S	8.0	L	8.0	S
B0246-6		7.8	VL	8.3	VL	9.0	M	7.7	M	8.1	VL	8.1	VL
B0246-8		8.0	VL	8.4	VL	9.3	M	8.0	M	8.2	VL	8.3	VL
B0251-5		6.8	VL	8.1	M	8.4	S	6.5	M	7.9	VL	7.3	VL
B0256-1		8.5	M	9.2	M	9.5	M	8.3	S	8.7	L	9.2	M
B0257-3		7.2	M	8.3	S	8.5	S	6.9	M	7.4	VL	7.1	M
Kennebec		8.3	S	8.8	O	9.2	S	8.2	S	8.7	M	9.2	M
Superior		8.4	L	9.2	M	9.7	S	7.9	M	8.6	VL	9.4	L

3Chips: 1-7 Satisfactory
 4Sprout length: O = no sprouts
 S = < 0.5"
 M = 0.5-1.5"
 L = 1.5-2.5"
 VL => 2.5"

BARC Table 4 (continued).

Pedigree	Temperature Date	40° F		40°-70° F		45° F		40° F		40°-70° F	
		2-21	Chip Spt	2-28	Chip Spt	3-6	Chip Spt	3-12	Chip Spt	3-27	Chip Spt
Atlantic		8.9	S	7.9	VL	9.5	L	9.4	L	8.1	M
B0242-2		7.5	L	7.9	M	7.2	L	7.8	L	7.4	M
B0242-3		7.8	S	7.0	M	7.7	L	7.5	L	7.3	M
B0242-31		8.7	M	7.8	M	8.2	L	8.7	L	7.6	M
B0243-10		9.2	S	7.8	M	8.5	L	9.0	M	8.0	S
B0243-11		8.6	M	8.1	L	8.4	VL	8.3	VL	8.1	L
B0243-18		7.9	M	7.3	L	7.8	L	7.8	L	7.4	M
B0243-20		9.1	L	8.2	VL	8.0	VL	8.7	VL	8.5	L
B0243-7		8.9	M	8.0	L	8.2	L	8.6	VL	8.8	M
B0245-15		7.5	O	7.0	S	7.4	O	7.2	O	7.3	S
B0245-8		8.9	S	8.1	M	8.5	VL	7.8	M	8.3	S
B0246-6		9.1	VL	7.8	VL	8.4	VL	9.2	VL	8.0	L
B0246-8		8.5	VL	8.3	VL	8.9	VL	8.8	VL	8.8	L
B0251-5		8.9	M	7.0	L	8.2	VL	8.2	VL	7.3	L
B0256-1		9.5	M	9.1	M	9.4	L	9.6	L	9.6	M
B0257-3		8.2	S	7.4	L	7.5	L	7.8	M	7.3	L
Kennebec		9.2	S	8.7	S	9.1	M	9.3	S	8.6	S
Superior		9.9	M	9.3	L	9.5	VL	9.6	L	9.3	M

BARC Table 5. Yield, tuber size distribution, and quality characteristics of round whites harvested 121 days after planting at Echo Lake in 1989.

Pedigree	Mkt CWT/A	%	Tuber size distribution						S.G. ¹	H.H. ²
			Mkt < 1-7/8"	1-7/8"- 2-1/4"	2-1/4"- 3-1/4"	3-1/4"- 4"	4"- > 4"			
AF236-1	417	92	6.3	20.1	55.3	16.1	2.1	75	2	
Atlantic	374	84	2.0	7.5	41.0	35.8	13.7	81	8	
B0257-12	364	88	5.0	15.1	50.6	22.4	7.0	77	1	
B0257-9	333	91	3.7	12.3	49.7	29.0	5.3	76	2	
B0347-4	203	92	5.7	31.1	53.8	7.6	1.8	74	0	
B0405-4	390	91	5.7	23.0	51.4	16.5	3.4	90	9	
B0405-6	402	93	6.6	30.4	54.3	8.6	0.0	71	0	
B0440-27	407	92	7.4	31.1	54.8	5.8	0.9	75	0	
B0443-10	216	84	16.4	46.4	31.8	5.8	0.0	76	0	
B0473-6	333	90	9.9	33.3	50.4	6.4	0.0	79	0	
B9792-2B	378	92	4.7	23.9	56.4	11.9	3.1	93	2	
Belchip	391	84	2.4	11.8	44.0	28.1	13.7	81	6	
La01-38	429	89	1.3	7.9	44.0	37.3	9.4	77	0	
73C26-1	341	92	6.4	25.1	54.7	11.8	2.0	74	1	
Norchip	410	94	4.6	20.7	52.7	20.7	1.3	79	1	
LSD (.05)										58

11.0 Omitted

2Number of tubers with hollow heart out of the largest 20 cut

BARC Table 5 (continued).

Pedigree	Temperature	50° F		45° F		40° F		40°-70° F		50° F		45° F	
		Date	1-17	1-23	2-5	2-2	2-8	2-14	Chip Spt				
73C26-1		8.2	VL	8.7	L	9.1	M	8.5	L	8.8	VL	9.0	VL
AF236-1		6.5	S	7.2	S	7.9	S	7.1	S	7.1	M	7.0	S
Atlantic		8.5	M	9.3	S	9.2	S	7.8	M	8.3	L	8.8	L
B0257-12		8.0	VL	8.6	S	8.6	S	8.6	VL	7.9	VL	8.4	VL
B0257-9		6.3	M	7.8	M	8.1	S	7.2	S	6.7	VL	7.0	L
B0347-4		7.3	S	7.9	S	8.9	S	8.4	S	7.8	M	8.1	M
B0405-4		7.1	M	7.4	L	8.1	L	6.9	M	7.6	VL	7.2	L
B0405-6		8.3	M	8.9	L	9.4	L	8.8	S	8.6	VL	8.9	VL
B0440-27		8.0	M	8.9	M	9.2	S	8.7	S	8.4	L	8.8	M
B0443-10		7.7	M	8.6	M	8.9	M	8.7	S	7.6	VL	8.5	L
B0473-6		7.9	L	9.0	M	9.3	S	8.7	S	7.8	VL	8.8	VL
B9792-2B		6.8	VL	7.4	L	8.0	S	6.0	L	7.2	VL	7.2	VL
Belchip		7.0	M	7.7	M	8.4	S	7.5	M	7.3	L	7.5	M
IA01-38		7.9	M	8.5	M	9.2	S	8.0	S	7.9	L	8.3	M
73C26-1		8.2	VL	8.7	L	9.1	M	8.5	L	8.8	VL	9.0	VL
Norchip		7.7	M	8.4	M	8.8	S	6.9	S	7.7	M	7.7	M

³Chips: 1-7 Satisfactory
⁴Sprout length: 0 = no sprouts

S = ~ 0.5"
 M = 0.5-1.5"
 L = 1.5-2.5"
 VL = ~2.5"

BARC Table 5 (continued).

Pedigree	Temperature	40° F		40°-70° F		45° F		40° F		40°-70° F	
		Date	Chip Spt	3-22	Chip Spt	3-1	3-6	Chip Spt	3-12	Chip Spt	3-28
AF236-1		7.9	S	7.5	S	7.5	L	7.5	M	7.7	S
Atlantic		9.2	M	8.1	L	9.2	VL	9.3	M	8.8	M
B0257-12		8.9	M	8.5	VL	8.7	VL	8.7	L	8.5	VL
B0257-9		7.8	S	7.4	L	8.0	VL	8.0	VL	7.1	L
B0347-4		9.0	S	8.7	M	8.3	M	8.8	M	9.0	M
B0405-4		8.0	L	8.0	L	8.2	VL	7.9	VL	7.7	L
B0405-6		9.5	L	9.6	L	9.2	VL	9.5	VL	9.8	L
B0440-27		9.3	S	8.9	M	9.4	L	9.2	L	9.5	S
B0443-10		9.1	M	8.6	M	8.7	VL	9.4	VL	9.3	M
B0473-6		9.3	O	9.3	M	8.9	VL	9.5	S	9.2	M
B9792-2B		8.0	L	7.5	VL	8.3	VL	8.0	VL	8.0	VL
Belchip		8.4	S	7.8	L	7.9	L	8.5	M	8.4	L
LA01-38		9.4	M	8.6	L	8.8	L	9.0	L	8.9	L
73C26-1		9.5	L	9.3	VL	9.5	VL	9.9	VL	9.6	VL
Norchip		8.5	S	7.2	M	8.0	L	8.7	M	7.8	M

BARC Table 6. Yield, tuber size distribution, and quality characteristics of russets harvested 121 days after planting at Echo Lake in 1989.

Pedigree	Mkt CWT/A	%	Tuber size distribution						S.G. 1	H.H. ²
			Mkt	< 2 oz	2-6 oz	6-10 oz	10-16 oz	>16 oz		
B0036-6	360	92	5.5	25.8	46.3	20.2	2.2	68	0	
B0045-6	386	93	6.5	31.5	49.4	12.1	0.5	82	14	
B0166-1	289	89	9.1	42.5	38.0	8.5	1.9	84	3	
B0169-56	356	86	11.6	34.2	42.4	9.0	2.8	77	0	
B0180-18	323	86	3.4	18.5	42.4	24.7	11.0	66	0	
B0180-39	323	89	3.6	14.8	45.7	28.2	7.8	67	1	
B0184-30	335	74	5.1	15.1	37.2	21.9	20.7	83	17	
B0186-1	346	89	5.8	23.6	42.9	22.4	5.2	79	4	
B0186-23	404	90	7.4	22.5	50.0	17.3	2.8	91	20	
B0186-3	299	88	12.1	50.5	33.3	4.1	0.0	88	0	
B0190-13	306	86	3.8	23.2	40.9	21.4	10.6	75	0	
B0190-9	417	82	4.3	19.3	35.7	26.7	14.0	79	3	
B0220-14	261	91	5.9	26.8	48.0	15.8	3.4	77	0	
B0303-11	172	84	16.1	48.7	31.0	4.2	0.0	64	0	
B0303-30	281	89	7.0	29.7	47.9	11.5	3.9	73	3	
Lemhi	368	72	5.6	16.2	33.7	22.4	22.1	83	8	
Russet Burbank	383	82	12.6	31.6	37.4	13.3	5.1	81	1	
Russette	394	93	2.2	21.3	51.5	20.0	5.0	84	7	
LSD (.05)		45								

¹1.0 Omitted

²Number of tubers with hollow heart out of the largest 20 cut

BARC Table 6 (continued).

Pedigree	Temperature	50° F		45° F		40° F		40°-70° F		50° F		45° F						
		Date	Fry ³	Spt ⁴	1-17	Fry	Spt	2-5	Fry	Spt	1-25	Fry	Spt	2-9	Fry	Spt	2-14	Fry
B0036-6		2.6	M	S	2.6	S	3.2	S	2.8	S	2.2	M	2.6	M	2.2	S	2.6	M
B0045-6		2.9	L	M	2.9	M	4.1	S	2.3	S	3.2	VL	3.4	VL	3.2	VL	3.4	VL
B0166-1		4.3	M	S	4.5	S	4.9	S	4.7	S	4.3	M	4.5	M	4.3	M	4.5	M
B0169-56		3.9	VL	M	3.8	M	4.4	M	4.0	M	4.3	VL	4.1	VL	4.3	VL	4.1	VL
B0180-18		3.6	L	M	3.8	M	4.4	S	3.3	S	3.8	VL	3.8	VL	3.8	VL	3.8	VL
B0180-39		3.0	L	L	2.9	L	3.8	S	2.5	S	3.1	VL	2.8	VL	3.1	VL	2.8	VL
B0184-30		3.5	VL	VIL	3.7	VIL	4.3	S	3.1	M	3.8	VL	3.9	VL	3.8	VL	3.9	VL
B0186-1		2.8	L	L	2.7	L	3.8	S	2.0	S	3.3	VL	3.3	VL	3.3	VL	3.3	VL
B0186-23		2.7	M	M	3.1	M	3.8	M	2.3	S	3.0	M	3.1	M	3.0	M	3.1	M
B0186-3		2.4	M	M	2.2	M	3.2	S	1.9	S	2.6	L	3.0	L	2.6	L	3.0	L
B0190-13		2.4	L	L	2.6	S	3.0	S	2.4	S	2.7	VL	2.9	VL	2.7	VL	2.9	VL
B0190-9		3.7	M	S	4.3	S	4.4	S	3.2	S	3.5	L	3.7	M	3.5	L	3.7	M
B0220-14		2.4	L	L	2.5	M	3.2	S	1.8	M	2.4	VL	2.7	L	2.4	VL	2.7	L
B0303-11		4.2	M	M	5.0	M	4.9	S	5.0	S	4.6	VL	4.6	L	4.6	VL	4.6	L
B0303-30		3.2	M	S	3.4	S	4.0	S	3.4	S	3.0	M	3.3	L	3.0	M	3.3	L
Lemhi		3.4	M	S	3.9	S	4.0	S	3.4	S	3.8	L	4.1	M	3.8	L	4.1	M
Russet Burbank		3.5	S	S	3.8	O	4.3	O	3.5	S	4.2	S	4.0	S	4.2	S	4.0	S
Russette		4.0	M	S	4.2	S	4.3	S	3.3	M	4.3	L	4.2	M	4.3	L	4.2	M

³French fry color: 1-3 = satisfactory
⁴Sprout length:

O = no sprout

S = <0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 6 (continued).

Pedigree	Date	Temperature		40° F		40°-70° F		50° F		45° F		40° F		40°-70° F	
		Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt
B0036-6		3.5	S	2.9	M	2.6	L	3.1	L	3.4	L	3.5	M	3.5	M
B0045-6		3.8	L	2.4	VL	3.4	VL	3.6	VL	3.9	VL	2.9	VL	2.9	VL
B0166-1		4.9	S	4.6	L	4.6	VL	4.7	L	4.8	M	4.7	VL	4.7	VL
B0169-56		4.7	M	4.1	VL	4.4	VL	4.2	VL	4.5	VL	4.4	VL	4.4	VL
B0180-18		4.1	M	3.6	L	4.1	VL	4.3	VL	4.3	L	4.3	VL	4.3	VL
B0180-39		3.6	M	3.2	VL	3.3	VL	3.5	VL	3.9	VL	3.4	VL	3.4	VL
B0184-30		4.4	L	3.8	VL	4.2	VL	3.9	VL	4.0	VL	3.5	VL	3.5	VL
B0186-1		3.8	L	3.1	L	3.1	VL	3.3	VL	4.0	VL	3.6	VL	3.6	VL
B0186-23		3.6	M	3.0	M	3.2	VL	3.5	L	3.8	L	3.3	L	3.3	L
B0186-3		3.5	M	2.7	M	2.9	VL	3.0	L	3.6	L	2.9	L	2.9	L
B0190-13		3.2	S	3.0	M	2.6	VL	3.1	VL	3.4	L	2.8	L	2.8	L
B0190-9		4.4	S	3.6	M	3.6	VL	3.5	L	4.4	S	3.5	M	3.5	M
B0220-14		3.7	L	3.2	M	2.5	VL	2.9	VL	3.1	VL	3.1	VL	3.1	VL
B0303-11		5.0	M	4.8	VL	4.6	VL	4.8	VL	4.6	L	4.9	VL	4.9	VL
B0303-30		4.3	S	3.6	M	3.1	VL	3.7	VL	4.1	VL	3.8	VL	3.8	VL
Lemhi		4.5	S	3.9	S	4.5	L	4.4	M	4.0	M	4.3	L	4.3	L
Russet Burbank		4.6	O	4.0	S	4.1	L	4.0	S	4.6	S	4.0	S	4.0	S
Russette		4.2	S	3.2	L	4.1	VL	4.3	VL	4.4	L	4.0	L	4.0	L

BARC Table 7. Yield, tuber size distribution, and quality characteristics of russets harvested 121 days after planting at Echo Lake in 1989.

Pedigree	Mkt CWT/A	%	Tuber size distribution							S.G. ¹	H.H. ²
			Mkt	< 2 oz	2-6 oz	6-10 oz	10-16 oz	>16 oz			
B0303-46	309	90	5.4	38.4	44.5	7.0	4.7	79	1		
B0306-6	335	93	5.4	39.2	46.2	7.5	1.8	79	0		
B0309-11	252	95	4.0	32.6	51.9	10.6	0.8	83	0		
B0310-11	289	87	4.0	32.4	43.1	11.4	9.2	81	0		
B0311-1	267	91	4.3	32.5	51.1	7.3	4.7	77	C		
B0311-12	247	87	8.4	40.9	37.9	8.6	4.2	74	0		
B0311-2	396	88	4.5	30.7	43.5	13.4	7.9	80	1		
B0312-10	317	91	4.8	28.5	48.4	14.3	3.9	83	12		
B0315-17	353	91	4.6	33.4	44.3	13.6	4.1	76	2		
B0315-4	207	86	13.1	47.2	37.4	1.4	0.8	77	0		
B0316-19	252	93	3.7	35.6	46.3	10.8	3.6	78	0		
B0316-36	291	89	10.9	53.4	33.0	2.7	0.0	88	1		
B0316-57	127	80	20.4	64.6	13.8	1.2	0.0	93	0		
B0317-18	284	91	9.3	44.7	39.4	6.6	0.0	80	2		
B0319-4	241	89	6.4	46.5	36.4	6.2	4.6	73	0		
BelRus	243	94	4.6	41.4	42.9	9.9	1.2	79	1		
ND534-4	340	85	3.6	25.6	43.4	15.6	11.8	71	4		
Russette	368	91	2.2	18.9	56.3	15.8	6.8	85	6		
LSD (.05)		45									

11.0 Omitted

²Number of tubers with hollow heart out of the largest 20 cut

BARC Table 7 (continued).

Pedigree	Temperature	50° F		45° F		40° F		40° - 70° F		50° F		45° F	
		Date	Fry 3 Spt ⁴	1-18	Fry Spt	1-24	Fry Spt	2-6	Fry Spt	1-26	Fry Spt	2-9	Fry Spt
B0303-46		3.5	L	3.3	VL	4.1	S	2.4	M	3.4	VL	3.1	VL
B0306-6		3.5	M	3.7	M	4.0	S	2.9	M	3.6	VL	3.5	VL
B0309-11		2.2	L	2.5	M	2.8	M	1.8	S	2.4	VL	2.4	L
B0310-11		2.7	VL	3.0	L	3.2	M	2.0	M	2.6	VL	3.1	VL
B0311-1		2.6	L	2.7	L	3.1	S	1.7	M	2.4	VL	2.5	VL
B0311-12		3.0	VL	3.1	L	4.0	M	2.4	S	3.4	VL	3.4	VL
B0311-2		3.6	M	4.0	M	4.3	S	2.8	M	3.7	L	3.7	M
B0312-10		2.2	M	2.4	M	3.2	S	1.8	S	2.0	L	2.6	L
B0315-17		2.9	L	3.2	M	4.1	S	2.8	S	2.7	L	3.2	L
B0315-4		2.7	VL	3.5	L	3.4	S	1.8	M	3.6	VL	2.9	VL
B0316-19		4.4	S	4.6	S	4.9	O	3.7	S	4.3	S	4.5	S
B0316-36		2.5	L	3.0	M	3.2	M	1.8	S	2.9	L	3.2	L
B0316-57		4.0	VL	3.9	L	4.4	M	3.2	M	4.2	L	4.1	L
B0317-18		3.5	L	3.2	M	3.9	S	2.2	M	3.2	VL	3.5	L
B0319-4		2.6	L	2.7	M	3.5	S	2.0	M	3.3	VL	2.9	M
BelRus		2.6	M	3.5	S	4.3	S	3.0	S	3.3	L	3.6	L
ND534-4		4.9	S	4.8	S	4.8	S	4.0	S	4.5	M	4.5	M
Russette		4.2	M	4.3	M	4.7	S	3.0	M	4.1	VL	4.1	L

³French fry color:¹⁻³ = satisfactory⁴Sprout length:

0 = no sprout

S = < 0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = > 2.5"

BARC Table 7 (continued).

Pedigree	Temperature	40° F		40° - 70° F		50° F		45° F		40° F		40° - 70° F		
		Date	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt
B0303-46			3.9	VL	3.4	VL	3.8	VL	4.0	VL	4.2	VL	3.1	VL
B0306-6			4.1	L	3.8	VL	3.6	VL	3.7	VL	4.2	VL	3.8	VL
B0309-11			3.1	M	2.6	L	2.9	VL	2.8	VL	3.2	VL	2.6	VL
B0310-11			3.6	L	3.2	L	2.8	VL	3.2	VL	3.7	VL	3.4	VL
B0311-1			3.4	L	2.7	VL	2.5	VL	3.0	VL	3.1	VL	2.9	VL
B0311-12			4.1	L	3.8	VL	3.7	VL	3.7	VL	4.1	VL	3.9	VL
B0311-2			4.3	S	3.7	L	4.0	VL	4.1	L	4.3	M	3.9	VL
B0312-10			3.2	M	2.7	M	2.3	VL	2.6	VL	3.1	L	2.4	VL
B0315-17			3.9	M	3.1	M	3.1	VL	4.1	VL	4.0	VL	3.5	VL
B0315-4			4.0	L	3.1	VL	3.1	VL	3.5	VL	4.0	VL	3.2	VL
B0316-19			4.8	S	4.5	S	4.3	L	4.7	M	4.8	M	4.7	M
B0316-36			4.0	L	2.6	L	2.9	VL	3.4	VL	3.5	VL	2.9	VL
B0316-57			4.5	M	4.3	L	4.3	VL	4.2	VL	4.5	L	4.6	VL
B0317-18			3.7	S	2.9	VL	3.0	VL	3.5	VL	3.8	L	3.0	VL
B0319-4			4.3	M	2.7	L	3.2	VL	3.4	VL	3.9	M	3.3	L
BelRus			4.5	M	4.1	L	3.7	VL	3.7	VL	4.2	L	4.4	VL
ND534-4			4.6	S	4.5	S	4.8	VL	4.8	VL	4.9	M	4.6	L
Russette			4.5	S	3.6	L	4.3	VL	4.4	VL	4.5	L	4.3	VL

BARC Table 8. Yield, tuber size distribution, and quality characteristics of russets harvested 120 days after planting at Echo Lake in 1989.

Pedigree	Mkt CWT/A	%	Tuber size distribution							S.G. ¹	H.H. ²
			Mkt	< 2 oz	2-6 oz	6-10 oz	10-16 oz	>16 oz			
B0319-26	352	87	4.3	34.4	42.5	10.0	8.8	8.5	11		
B0324-25	371	86	2.3	15.2	52.6	18.6	11.3	8.3	4		
B0324-5	268	86	3.2	24.5	50.3	11.2	10.7	7.8	0		
B0325-1	366	91	6.7	41.6	37.9	11.0	2.8	8.4	1		
B0325-5	450	91	3.6	29.4	40.6	20.8	5.6	8.7	1		
B0326-15	319	94	3.4	35.6	45.5	13.4	2.1	8.7	1		
B0326-20	273	86	12.7	48.1	30.8	6.8	1.6	7.8	0		
B0327-1	320	89	7.7	38.3	40.2	10.9	2.9	7.6	0		
B0327-9	253	94	5.8	40.6	47.0	6.6	0.0	8.2	0		
B0328-2	276	85	10.5	49.1	28.3	7.8	4.2	8.5	4		
B0328-7	323	90	3.9	24.9	49.8	15.6	5.7	7.3	0		
B0329-1	350	92	4.6	30.6	48.6	12.4	3.9	7.7	5		
B0329-10	346	90	4.0	33.5	42.1	14.9	5.6	8.7	7		
B0330-39	334	89	6.0	43.2	36.1	10.1	4.6	8.1	4		
B0332-13	347	89	5.8	40.0	41.1	8.2	4.8	8.0	9		
Bell Rus	263	94	4.4	46.2	42.6	5.0	1.7	8.1	1		
Coastal Russet	390	90	3.8	28.8	49.2	12.2	6.1	7.2	3		
Russet Burbank	425	80	5.0	29.1	31.4	19.2	15.3	7.9	2		

LSD (.05) 54

11.0 Omitted

²Number of tubers with hollow heart out of the largest 20 cut

BARC Table 8 (continued).

Pedigree	Temperature Date	50°F		45°F		40°F		40°-70°F		50°F		45°F	
		Fry ³	Spt ⁴	1-11	1-24	2-6	Fry Spt	1-26	Fry Spt	Fry Spt	2-9	Fry Spt	Fry Spt
B0319-26		2.7	VL	2.8	L	4.2	S	3.2	M	2.8	VL	3.6	VL
B0324-25		3.4	VL	4.0	L	4.4	S	3.2	L	3.9	VL	4.2	VL
B0324-5		2.3	L	2.5	L	2.9	M	2.1	M	2.6	VL	2.8	VL
B0325-1		4.0	M	4.8	L	4.8	S	3.5	M	4.4	VL	4.6	L
B0325-5		4.2	M	4.6	M	5.0	S	3.6	M	4.6	VL	4.5	VL
B0326-15		2.9	L	3.1	VL	3.9	S	3.0	M	3.0	VL	3.6	VL
B0326-20		3.0	VL	2.9	VL	3.8	M	2.9	M	3.3	VL	3.2	VL
B0327-1		4.1	VL	3.9	VL	4.3	L	4.1	L	4.5	VL	4.3	VL
B0327-9		3.6	L	3.8	M	4.1	S	3.0	M	3.4	VL	3.9	VL
B0328-2		4.3	VL	5.0	VL	4.9	VL	4.3	L	4.6	VL	4.5	VL
B0328-7		4.1	S	3.9	S	4.2	O	4.3	M	4.0	VL	4.1	M
B0329-1		4.0	VL	4.2	M	4.7	S	3.2	M	4.2	VL	4.2	L
B0329-10		3.1	M	3.5	S	4.0	O	3.0	S	3.0	M	3.4	M
B0330-39		3.3	M	3.4	M	4.0	S	3.0	S	3.2	L	3.6	L
B0332-13		3.5	L	3.9	S	4.4	S	3.7	M	4.0	VL	4.0	M
BelRus		3.5	M	3.6	M	4.1	S	4.0	M	3.6	VL	4.0	VL
Coastal Russet		5.0	M	5.0	M	5.0	S	4.8	M	5.0	L	4.9	M
Russet Burbank		4.5	O	4.7	O	4.9	O	4.4	S	4.6	M	4.5	S

³French fry color 1-3 = Satisfactory
⁴Sprout length: 0 = no sprouts

S = < 0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 8 (continued).

Pedigree	Temperature Date	40° F		40°-70° F		50° F		45° F		40° F		40°-70° F	
		2-26 Fry	Spt	3-2 Fry	Spt	3-16 Fry	Spt	3-7 Fry	Spt	3-13 Fry	Spt	3-23 Fry	Spt
B0319-26		4.3	L	3.6	VL	3.3	VL	3.6	VL	4.3	VL	3.6	VL
B0324-25		4.4	L	3.9	VL	4.3	VL	4.2	VL	4.5	VL	3.8	VL
B0324-5		3.6	L	2.7	VL	2.6	VL	3.0	VL	3.7	VL	2.8	VL
B0325-1		4.6	VL	3.9	L	4.4	VL	4.8	VL	4.8	VL	4.4	VL
B0325-5		5.0	VL	4.0	VL	4.5	VL	4.7	VL	4.7	VL	4.5	VL
B0326-15		3.8	VL	3.9	VL	3.3	VL	3.4	VL	3.8	VL	3.6	VL
B0326-20		3.9	VL	3.2	VL	3.4	VL	3.4	VL	3.7	VL	3.2	VL
B0327-1		4.6	VL	4.5	VL	4.5	VL	4.4	VL	4.4	VL	4.6	VL
B0327-9		4.3	M	3.9	VL	4.1	VL	3.8	VL	4.4	VL	3.9	VL
B0328-2		4.9	VL	4.5	VL	4.8	VL	4.9	VL	5.0	VL	4.5	VL
B0328-7		4.4	S	4.3	VL	4.2	VL	4.2	M	4.4	M	4.3	VL
B0329-1		4.6	L	3.7	VL	4.4	VL	4.4	VL	4.7	L	3.9	VL
B0329-10		4.1	S	3.4	M	3.5	VL	3.6	L	4.1	S	3.4	M
B0330-39		4.1	L	3.3	L	3.2	VL	3.7	L	4.0	L	3.1	L
B0332-13		4.5	S	4.0	VL	4.0	VL	4.1	VL	4.6	M	4.1	L
BelRuss		4.5	M	4.2	VL	4.2	VL	4.0	VL	4.4	L	4.4	VL
Coastal Russet		5.0	S	5.0	VL	5.0	VL	4.9	L	5.0	S	4.9	VL
Russet Burbank		4.6	O	4.3	M	4.6	L	4.6	S	4.7	O	4.6	L

BARC Table 9. Yield, tuber size distribution, and quality characteristics of russets harvested 120 days after planting at Echo Lake in 1989.

Pedigree	Mkt CWT/A	%	Tuber size distribution							S.G. ¹	H.H. ²
			Mkt	< 2 oz	2-6 oz	6-10 oz	10-16 oz	> 16 oz			
B0334-23	271	83	16.5	45.7	29.7	8.1	0.0	74	5		
B0336-24	221	82	15.8	31.1	37.8	13.3	2.0	68	1		
B0336-5	205	74	26.0	48.3	22.9	2.7	0.0	77	0		
B0338-17	372	87	7.1	33.8	42.7	10.1	6.4	83	19		
B0338-18	304	86	11.2	34.4	41.7	9.4	3.3	69	0		
B0338-2	232	83	15.5	39.2	31.3	12.2	1.8	68	0		
B0338-5	306	88	6.0	15.6	52.4	19.9	6.0	71	2		
B0338-6	278	88	9.6	40.4	42.1	5.5	2.4	73	1		
B0338-9	197	82	14.8	53.1	26.3	2.3	3.5	77	3		
B0339-1	343	83	5.2	21.1	46.9	14.7	12.0	68	8		
B0339-16	152	75	25.1	57.0	17.0	0.9	0.0	74	0		
B0339-17	295	90	9.7	37.4	43.5	9.4	0.0	74	2		
B0344-12	268	85	13.0	44.0	32.9	8.0	2.1	74	0		
B0345-11	219	85	13.2	44.0	33.4	7.1	2.3	67	0		
B0348-1	265	85	6.7	29.0	38.7	17.4	8.2	69	4		
BelRus	216	85	15.0	40.6	41.7	2.7	0.0	77	0		
Lemhi	359	85	9.7	26.3	44.7	14.2	5.1	76	7		
Russet Burbank	370	78	15.6	26.5	38.5	13.2	6.2	79	0		
LSD (.05)											

11.0 Omitted

2 Number of tubers with hollow heart out of the largest 20 cut

BARC Table 9 (continued).

Pedigree	Temperature	50°F		45°F		40°F		40°-70°F		50°F		45°F	
		Date	Fry ³	Spt ⁴	1-18	1-25	Fry Spt	2-6	Fry Spt	1-26	Fry Spt	2-12	Fry Spt
B0334-23			3.1	VL	3.3	VL	4.1	M	3.6	M	3.3	VL	4.1 VL
B0336-24			4.0	M	4.2	M	4.5	M	3.2	M	4.1	VL	4.4 L
B0336-5			2.3	M	2.5	L	3.1	S	2.3	S	2.5	L	3.4 VL
B0338-17			3.6	L	3.4	M	3.6	S	3.5	M	3.6	VL	3.6 M
B0338-18			4.2	M	4.3	S	4.7	S	4.1	S	4.1	VL	4.4 L
B0338-2			3.9	M	3.8	S	4.5	S	4.1	S	4.1	L	4.2 S
B0338-5			3.7	S	3.9	O	4.3	S	3.7	S	3.7	M	4.0 S
B0338-6			4.2	M	4.0	S	4.8	S	3.8	M	4.4	L	4.3 M
B0338-9			3.8	L	3.9	S	4.1	S	3.1	S	4.1	L	4.0 L
B0339-1			3.6	L	3.7	L	4.1	S	3.6	M	3.7	VL	3.9 VL
B0339-16			3.4	M	3.3	S	4.1	S	3.5	M	3.6	VL	3.8 M
B0339-17			2.9	S	3.9	S	4.3	S	3.9	S	3.3	M	3.7 M
B0344-12			2.6	VL	2.8	L	2.9	M	2.7	M	2.9	VL	3.0 VL
B0345-11			2.4	M	2.7	M	3.5	S	2.8	M	3.1	VL	3.5 VL
B0348-1			3.5	M	3.7	M	4.4	M	3.1	M	3.2	VL	3.9 M
BelRus			2.8	S	2.9	S	4.4	S	2.8	S	3.0	L	3.9 M
Lemhi			3.8	S	4.2	S	4.2	S	3.3	S	4.0	L	4.2 S
Russet Burbank			3.9	S	4.2	O	4.4	O	3.6	S	3.8	S	4.2 S

³French fry color:⁴Sprout length:1-3 = satisfactory
0 = no sprout
S = < 0.5"

M = 0.5-1.5"

L = 1.5-2.5"

VL = >2.5"

BARC Table 9 (continued).

Pedigree	Temperature	40° F		40°-70° F		50° F		45° F		40° F		40°-70° F		
		Date	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt
B0334-23		4.1	VL		3.6	VL	3.9	VL	4.2	VL	4.0	VL	3.7	VL
B0336-24		4.6	L		4.4	L	4.3	VL	4.6	VL	4.7	VL	4.4	L
B0336-5		3.8	L		2.6	L	2.7	VL	2.9	VL	3.5	VL	3.0	L
B0338-17		3.8	M		4.0	M	3.3	VL	3.5	VL	3.4	L	3.8	L
B0338-18		4.5	S		4.7	VL	4.3	VL	4.5	VL	4.8	M	4.6	L
B0338-2		4.8	S		4.5	M	4.3	VL	4.3	M	4.5	M	4.6	M
B0338-5		4.5	O		4.1	M	4.1	VL	4.1	M	4.2	S	4.1	M
B0338-6		4.6	M		4.6	L	4.3	VL	4.6	VL	4.5	L	4.5	L
B0338-9		4.2	M		4.4	L	4.2	VL	4.2	VL	4.4	M	4.0	L
B0339-1		4.0	L		4.1	VL	4.1	VL	3.8	VL	4.2	L	4.0	VL
B0339-16		4.3	S		4.2	L	3.9	VL	3.9	VL	4.4	M	3.9	M
B0339-17		4.3	S		3.7	M	3.7	L	4.0	M	4.4	M	3.5	S
B0344-12		3.6	VL		3.4	VL	3.2	VL	3.3	VL	3.3	VL	3.2	VL
B0345-11		4.0	L		3.1	L	3.4	VL	3.3	VL	4.1	L	3.8	L
B0348-1		4.4	VL		3.9	VL	3.8	VL	4.2	VL	4.5	VL	4.3	M
BelRus		4.2	M		3.9	L	3.4	VL	4.0	L	4.2	L	3.6	M
Lemhi		4.1	S		4.4	M	4.1	VL	4.5	M	4.5	M	4.2	M
Russet	Burbank	4.4	O		4.2	S	4.3	L	4.4	S	4.6	0	4.2	M

BARC Table 10. Yield, tuber size distribution, and quality characteristics of russets harvested 120 days after planting at Echo Lake in 1989.

Pedigree	Mkt CWT/A	%	Tuber size distribution							S.G. ¹	H.H. ²
			Mkt	< 2 oz	2-6 oz	6-10 oz	10-16 oz	> 16 oz			
B0348-2	297	80	2.4	12.1	45.9	21.7	17.7	7.8	0		
B0348-6	300	94	3.4	22.1	53.4	18.6	2.5	75	4		
B0352-17	274	92	6.0	45.6	42.2	3.8	2.4	77	1		
B0358-14	361	91	3.0	16.9	51.2	22.5	6.4	81	2		
B0362-1	272	90	5.3	33.8	44.5	11.8	4.6	76	2		
B0362-2	370	93	3.7	24.7	55.7	12.7	3.1	91	3		
B0367-15	360	92	4.2	32.2	43.2	16.7	3.8	72	1		
B0367-2	335	96	4.3	37.6	50.4	7.7	0.0	74	1		
B0367-6	216	86	12.7	59.5	24.1	2.8	0.9	75	0		
B0369-12	326	87	10.4	36.9	39.1	11.2	2.4	84	8		
B0369-13	268	92	5.5	39.4	47.6	5.3	2.2	83	1		
B0372-12	342	88	6.1	27.2	47.4	13.6	5.7	73	10		
B0384-4	270	94	4.7	40.3	46.7	7.4	0.9	74	7		
B0386-9	380	94	6.4	36.8	49.7	7.1	0.0	75	0		
B9922-11	338	68	1.6	8.6	39.8	19.5	30.5	77	6		
BelRus	273	95	4.4	49.1	43.9	1.7	0.9	80	0		
ND534-4	319	78	2.7	17.7	51.0	9.4	19.1	68	2		
Russet Burbank	417	80	5.8	29.9	37.6	12.6	14.2	75	0		
LSD (.05)			42								

¹1.0 Omitted

²Number of tubers with hollow heart out of the largest 20 cut

BARC Table 10 (continued).

Pedigree	Temperature Date	50° F		45° F		40° F		40°-70° F		50° F		45° F	
		Fry	Spt ³	Fry	Spt ⁴	Fry	Spt	Fry	Spt	Fry	Spt	Fry	Spt
B0348-2		3.6	L	4.4	M	4.9	M	3.9	M	4.2	VL	4.6	VL
B0348-6		2.6	VL	2.8	L	3.7	S	2.7	L	3.3	VL	3.5	VL
B0352-17		4.2	M	4.6	S	4.9	S	4.5	S	4.5	M	4.7	L
B0358-14		3.6	M	3.2	M	3.9	S	3.0	M	3.4	L	3.7	VL
B0362-1		4.0	VL	3.9	L	4.2	L	3.3	L	4.3	VL	4.2	VL
B0362-2		2.7	L	2.9	L	3.8	S	1.7	M	2.9	VL	3.4	VL
B0367-15		4.0	VL	3.9	M	4.2	M	3.5	M	4.1	VL	4.3	VL
B0367-2		3.7	VL	4.2	L	4.4	S	3.9	M	4.2	VL	4.1	VL
B0367-6		3.0	VL	3.2	M	3.8	M	2.6	L	3.3	VL	3.8	VL
B0369-12		2.9	L	3.2	M	4.1	M	3.4	M	3.2	VL	3.8	L
B0369-13		2.3	M	2.9	S	3.9	S	2.2	M	3.3	VL	3.7	M
B0372-12		3.2	M	3.7	M	3.9	S	3.8	M	3.7	L	4.0	M
B0384-4		2.6	L	3.0	M	3.6	S	2.7	M	3.4	VL	3.4	L
B0386-9		3.3	VL	3.9	VL	3.9	VL	3.0	L	3.8	VL	4.0	VL
B9922-11		4.3	M	4.2	S	4.4	S	3.2	S	3.9	L	4.3	M
BelRus		3.1	M	3.1	S	3.9	S	3.4	S	3.3	L	3.7	L
ND534-4		4.4	S	4.3	S	4.6	S	4.0	S	4.7	L	4.4	M
Busset Burbank		4.4	S	4.4	O	4.4	O	3.5	S	4.2	M	4.3	O

3French fry color: 1-3 = satisfactory
 4Sprout length:
 O = no sprout
 S = <0.5"
 M = 0.5-1.5"
 L = 1.5-2.5"
 VL = >2.5"

BARC Table 10 (continued).

Pedigree	Temperature	40°F		40°-70°F		50°F		45°F		40°F		40°-70°F	
		Date	Fry Spt	3-27	3-5	Fry Spt	3-19	Fry Spt	3-8	Fry Spt	3-15	Fry Spt	3-26
B0348-2		4.6	L	4.4	VL	4.0	VL	4.5	VL	4.7	L	4.3	VL
B0348-6		4.2	L	4.1	VL	3.7	VL	3.8	VL	4.4	VL	3.9	VL
B0352-17		5.0	S	4.9	L	4.7	VL	4.8	L	5.0	M	5.0	M
B0358-14		4.0	L	3.8	L	3.8	VL	3.7	VL	4.0	L	3.4	M
B0362-1		4.3	VL	3.8	VL	4.3	VL	4.3	VL	4.5	VL	4.1	VL
B0362-2		3.8	L	2.4	VL	3.4	VL	3.3	VL	3.6	VL	2.7	VL
B0367-15		4.6	VL	4.0	VL	4.3	VL	4.3	VL	4.3	VL	3.9	VL
B0367-2		4.4	VL	4.5	VL	4.2	VL	4.2	VL	4.9	VL	4.4	VL
B0367-6		4.1	VL	3.6	VL	3.4	VL	3.8	VL	3.8	VL	3.7	VL
B0369-12		4.0	L	4.2	VL	3.8	VL	3.7	VL	4.1	VL	3.8	M
B0369-13		3.7	M	3.4	L	3.1	VL	3.3	VL	4.2	M	3.4	L
B0372-12		4.2	L	4.2	L	4.0	VL	4.0	L	4.0	L	3.7	M
B0384-4		4.0	M	3.3	VL	4.0	VL	3.7	VL	4.0	L	3.7	L
B0386-9		3.9	VL	3.6	VL	4.2	VL	4.3	VL	4.2	VL	3.6	VL
B9922-11		4.1	M	3.9	M	4.3	VL	4.6	L	4.7	L	4.1	M
BelRus		4.2	M	3.9	L	3.7	VL	3.9	VL	4.3	L	3.8	L
ND534-4		4.6	S	4.5	M	4.6	VL	4.6	L	4.7	L	4.6	M
Russet Burbank		4.2	O	3.9	M	4.5	VL	4.8	S	4.4	S	4.1	M

BARC Table 11. Yield, tuber size distribution, and quality characteristics of specialty market type potatoes harvested 118 days after planting at Echo Lake in 1989.

Pedigree	Mkt CWT/A	Mkt %	Tuber size distribution						S.G. ¹	
			< 1-7/8"		1-7/8-		2-1/4"-			
			2-1/4"	3-1/4"	3-1/4"	4"	> 4"			
AL1-67-0P-3-77	259	79	20.9	43.6	32.2	3.4	0.0	72		
AL37-65-9-67	331	95	5.2	21.3	36.4	37.2	0.0	65		
B0032-35	260	98	2.2	22.8	61.4	13.6	0.0	69		
B0032-40	298	88	10.3	26.0	55.7	5.9	2.1	64		
B0033-23	394	89	5.4	22.3	51.5	15.5	5.3	65		
B0180-24	464	89	11.0	30.5	47.1	11.4	0.0	75		
B0615-1	365	87	3.7	9.6	51.0	26.7	9.1	64		
B0615-2	414	84	7.8	20.6	46.1	17.0	8.5	66		
B0616-1	438	90	6.4	11.7	53.4	25.0	3.6	70		
B0616-4	459	94	4.1	14.8	50.1	29.1	2.0	66		
Caribe	407	88	3.2	9.4	45.8	33.3	8.3	67		
Cowhorn	476	84	7.9	28.2	37.4	18.2	8.3	75		
GoldRus	342	90	9.6	35.7	48.4	6.3	0.0	77		
La Rouge	476	88	5.3	16.4	36.6	35.5	6.2	67		
Patrones	359	80	17.6	46.5	31.7	1.9	2.3	85		
Red Gold	359	90	9.7	31.7	39.8	18.8	0.0	70		
Sangre	437	90	10.3	29.4	36.0	24.2	0.0	68		
Yukon Gold	345	88	5.3	19.4	49.7	19.4	6.3	82		
LSD (.05)									96	

11.0 Omitted

BARC Table 11. (continued).

Pedigree	Temperature Date	50° F		45° F		40° F		40° -70° F	
		1-17 Chip ²	Spt ³	1-23 Chip	Spt	2-7 Chip	Spt	2-1 Chip	Spt
AL1-67-0P-3-77	10.0 M	10.0 S		10.0 N		10.0 S		10.0 M	
AL37-65-9-67	8.1 VL	9.0 M		9.2 S		8.6 L			
B0032-35	7.5 M	8.6 S		9.1 S		8.5 S			
B0032-40	8.9 M	10.0 S		9.9 O		9.3 S			
B0033-23	9.2 M	9.8 S		9.9 S		9.1 S			
B0180-24	8.3 L	8.5 M		9.1 S		7.9 L			
B0615-1	8.7 M	9.5 M		9.6 S		8.9 M			
B0615-2	8.7 S	9.3 S		9.9 O		8.7 S			
B0616-1	9.4 S	10.0 S		10.0 S		9.9 S			
B0616-4	8.9 S	9.3 S		10.0 O		9.0 S			
Caribe	7.6 S	8.7 S		9.1 S		8.5 S			
Cowhorn	8.8 S	9.1 M		9.0 S		9.0 S			
GoldRus	7.1 L	8.1 M		8.5 S		8.3 M			
La Rouge	9.5 M	9.4 S		9.7 O		9.7 S			
Patrones	8.5 S	9.1 S		9.4 S		9.5 S			
Red Gold	7.7 VL	8.5 M		9.0 M		8.2 VL			
Sangre	9.7 S	9.9 S		10.0 S		9.9 S			
Yukon Gold	9.0 S	9.9 S		9.9 S		9.5 S			

² Chips: 1-7 Satisfactory
³ Sprout length: 0 = no sprouts

S =< 0.5"
M = 0.5-1.5"
L = 1.5-2.5"
VL => 2.5"

BARC Table 12. American and foreign potato collection currently maintained in tissue culture (disease-free).

Acadia Russet	Campbell 14	Islander	Red Pontiac
Agassiz	Centennial Russet	Kanona	Rideau
Alasclear	Chieftan	Katahdin	Rhinered
Allagash Russet	Chipbelle	Kennebec	Rosa
Alaska Russet	Chippewa	Krantz	Russet Burbank
Allegany	Columbia Russet	La Chipper	Russet Norkotah
Alpha	Coastal Chip	Langlade	Saco
Arran Consul	Coastal Russet	Lemhi Russet	Saginaw Gold
Atlantic	Crystal	Monona	Sangre
Bake-King	Denali	Norchip	Sebago
Banana	Donna	Norgold	Shepody
Belchip	Elba	Norland	Somerset
BelRus	GoldRus	Oceania	Superior
Bintje	Green Mountain	Ontario	Up to Date
Butte	Greta	Pungo	Wauseon
Calgold	Hampton	Reddale	White Burbank
Campbell 13	Hudson	Red La Soda	

USDA-AGRICULTURAL RESEARCH SERVICE - WESTERN U.S.

J. J. Pavek and D. L. Corsini
Aberdeen, Idaho

The 1989 breeding effort continued at slightly above the level of that of 1987-88. In the Aberdeen greenhouses, 878 4X and 58 2X crosses were made and 100,000 seedling tubers were produced. The first-size tubers were grown as spaced plants at Aberdeen and the second- and third-size were distributed to cooperators in Oregon, California, Colorado, Texas, and North Dakota. Hybrid seeds of 180 of our crosses were also grown out in Oregon.

Yield trials:

Yield trials with 238 preliminary to advanced selections, were conducted at one or two Idaho locations. About 75% of the selections were long russets for processing and the rest were chippers, diseases resistant or otherwise interesting selections, and various diploids. Emphasis was placed on french frying and chipping out of long-term storage.

Seed Increase:

Indexed (for PVX, PVY, PLRV, PSTV) seed of 309 clones at Aberdeen and 148 clones at Tetonia was produced. In addition non-indexed seed of 327 early generation clones was also produced in tuber units at Aberdeen. Seed of these clones was used in our own and in various cooperator trials.

Disease Trials:

Several disease trials were conducted using naturally occurring (verticillium, scab) or hand inoculated (PLRV, Alternaria, Fusarium, Erwinia) pathogens. Results for the advanced selections and few varieties are shown in ARS Table 1.

Releases:

BR7093-24 was released for chipping as 'Gemchip' in August 1989, and A74114-4 was released for early processing and fresh packing in April 1990. A7411-2 is being considered for release as a processing and fresh pack russet within the next year. These three clones are well adapted to the irrigated agriculture of the Western U.S.

Germplasm development:

Special efforts are underway to develop germplasm with (1) resistance to storage rots (Fusarium species plus Erwinia), (2) combined resistance to PVX, PVY, AND PLRV, and (3) resistance to blackspot bruise. This work has continued for several years.

ARS Table 1. Field and storage diseases, sprout growth and desiccation in storage for entries in the 1989 Western Regional Trial, Western Chipping Trial, Tri-State Trial, and for miscellaneous breeding selections and varieties.

Clone	Field						Storage					
	Verticillium Wilt 1/	Early Blight 2/	Common Scab 3/	Leafroll			Fusarium Dry Rot 5/	Erwinia Soft Rot 6/	Sprout Growth 7/	Desiccation 7/		
				Net	Necrosis	4/						
<u>Western Regional Trial</u>												
A7816-14	2	2	0	3	3	5	5	3	3	3	3	3
A7961-1	4	3	0	1	3	4	3	3	4	3	3	3
AC77101-1	3	4	0	1	1	4	3	3	2	3	2	3
AC7869-17	4	2	0	2	2	4	2	2	3	2	2	2
AC81198-11	3	2	0	1	1	5	3	2	2	2	2	2
A081216-1	3	2	0	2	4	3	2	2	3	3	3	3
A082283-1	2	2	2	1	1	5	3	3	4	4	4	4
A082611-7	4	3	0	1	1	5	3	3	2	2	2	4
BC0038-1	5	3	2	2	2	4	3	3	3	3	3	3
C07918-11	3	3	3	2	2	5	2	2	3	2	2	2
C08011-5	2	3	0	1	1	4	3	3	4	4	4	4
TND329-1RUS	4	4	0	3	1	4	2	2	3	3	3	3
NDTX8-731-1R	5	4	2	2	2	4	4	4	4	4	4	4
NDTX9-1068-11R	3	3	2	2	2	5	5	5	5	3	3	3
<u>Western Chipping Trial</u>												
A80559-2	2	2	2	1	1	2	4	4	4	4	3	2
AC80545-1	4	2	0	1	1	4	4	4	4	4	2	2
NDA2031-2	3	2	1	1	1	5	2	2	3	3	2	2
NDA2126-6	4	3	1	1	1	5	4	4	4	4	3	3
NDO1496-1	3	3	2	2	1	5	5	5	5	5	4	3
<u>Tri State Trial</u>												
A7896-7	3	3	0	2	2	3	-	5	-	2	2	2
A81323-6	3	3	0	3	2	2	-	-	-	2	2	3
A81386-1	2	2	0	2	2	2	-	-	-	2	2	2
A81473-2	1	2	0	1	1	3	-	-	-	1	1	2
A81727-6	3	2	0	1	1	3	-	-	-	3	3	3

ARS Table 1 cont.

Clone	Field				Storage			
	Verticillium Wilt 1/	Early Blight 2/	Common Scab 3/	Leafroll Net Necrosis 4/	Tuber Early Blight 4/	Fusarium Dry Rot 5/	Erwinia Soft Rot 6/	Sprout Growth 7/
<u>Tri-State Trial (cont.)</u>								
A81779-2	4	2	0	2	1	-	-	2
A82119-3	2	2	0	1	4	-	-	3
A82807-1	3	2	0	1	1	-	-	3
A081362-3	4	2	0	2	2	-	-	2
A082616-18	4	3	0	1	1	-	-	3
A083037-10	4	3	0	3	3	-	-	2
A083110-3	2	2	0	1	3	-	-	4
A083119-3	4	3	0	2	1	-	-	4
A083177-6	3	2	0	2	4	-	-	3
C0083008-1	2	2	0	3	2	-	-	2
C0083021-1	1	1	2	2	3	-	-	3
<u>Miscellaneous</u>								
A7411-2	2	2	1	2	3	3	-	3
C08138-6	5	4	1	3	3	-	-	4
C08182-1	5	5	1	3	2	-	-	2
C08195-4	4	3	0	2	1	-	-	3
BC0224-3	5	3	1	3	3	-	-	4
<u>Varieties</u>								
Atlantic	3	2	1	1	2	5	2	3
A74212-1(Century Russet)	1	2	0	4	3	4	3	3
Frontier Russet	4	4	0	4	3	3	2	2
Gemchip	1	2	1	1	3	2	2	2
Lemhi Russet	4	3	0	2	1	5	4	3
Norchip	5	4	0	1	2	3	4	4
Norking	4	4	0	4	1	5	3	3
Norgold Russet	5	4	0	2	2	5	5	5
Red LaSoda	2	3	2	3	3	3	4	3
Russet Burbank	4	3	0	3	1	5	1	1
Shasta	3	2	2	2	4	-	3	3

ARS Table 1 cont.
Footnotes:

- 1/ Verticillium wilt: 0 = none to 5 = most severe (>95% of stems dead and dying with typical verticillium wilt symptoms), only one field had serious wilt problems in 1989.
- 2/ Early Blight: 0 = none to 5 = most severe (>95% of leaflets dead or dying with typical early blight lesions), two fields had good early blight development with little verticillium wilt to interfere in 1989.
- 3/ Common scab: 0 = none to 5 = most severe based on an index taking into account the percentage of tubers with scab, the type of scab (superficial to deep pit) and the scab coverage on the worst tuber (grade defect). Scab incidence moderate in 1989.
- 4/ Net necrosis and tuber blight: 0 = none to 5 = most severe; average severity of tubers showing symptoms and % tubers showing severity 2 or greater (a noticeable grading defect); plots exposed to leafroll from leafroll infected spreader rows; no attempt was made to distinguish leafroll net necrosis from physiological symptoms. Tuber early blight same index system as for leafroll; tubers harvested immature from plots having early blight infection. Symptoms of net necrosis and tuber blight read after 4-5 months storage at 50F.
- 5/ Fusarium dry-rot: 0 = none to 5 = most severe; artificial inoculation with F. sambucinum and F. coeruleum; maximum rot score for either species reported; '88 and '89 data used.
- 6/ Erwinia soft-rot: 0 = none to 5 = most severe; artificial inoculation with E. atroseptica; '88 and '89 data used.
- 7/ Sprout growth and degree of desiccation: 1 = minimum, 5 = maximum after 4-5 months storage at 50F; average of tubers from leafroll net necrosis evaluations (Kimberly, ID) and from the tuber early blight evaluations (Aberdeen, ID).

INTER-REGIONAL POTATO INTRODUCTION PROJECT (IR-1)

J.B. Bamberg and R.E. Hanneman, Jr.

Introduction of
New Stocks

APHIS has decided to no longer allow IR-1 to perform first seed increases and submit a sample for subsequent Quarantine testing. Dr. Bamberg visited Quarantine in May to plan cooperation which would result in accomplishing both quarantine and germplasm objectives. This trip was synchronized with the flowering of plants grown from tubers collected in Mexico in 1988 such that IR-1 seed increase procedures could be demonstrated. Seed produced on these plants would require a Quarantine evaluation period of only one year instead of the two years required for tuber imports, as well as accomplish the first increase for distribution. These pollinations yielded no seed, perhaps because it was too late in the spring to maintain cool temperatures in the greenhouse. This scheme remains promising, however, and will be attempted on future clonal introductions. Since Quarantine must now test original seed before receipt by IR-1, collections consisting of only a few seeds must be grown into individual plants, tested, and propagules sent to IR-1 for maintenance. Thus, IR-1 received 40 families of rooted cutting from such accessions from the 1988 Mexican expedition. An additional 56 seedlots from this expedition were received, as well as 31 seedlots of miscellaneous breeding stock hybrid populations. Seventy-three foreign varieties were received as tubers. One variety of historic interest, "Ozette", was received from S. M. Dietz at W-6 (Pullman, WA) for preservation. Seventy-eight accessions of non-tuber-bearing species were received as seed from the spring 1989 expedition to Chile, because these species are not presently subject to the restrictions which apply to tuber-bearing species. When these were tested for PSTV, one S. brevidens accession was found to be infected. This has prompted a re-evaluation by APHIS of its policy with respect to these species. In summary, a total of 279 new introductions were added to the Collection in 1989. IR-1 has requested importation of three superior haploid inducing pollinators from J. G. Hermsen, Wageningen, the Netherlands. IR-1 requested and was granted permission to import fruits from expeditions directly to Quarantine. Seed extraction will take place in Beltsville, allowing collectors in the field to devote this considerable savings of time to pursuit of additional collections.

Preservation and
Increase of Stocks

Most of the introductions in the Collection are maintained as true seed. Over 360 families were intermated for seed increases in 1989.

Five clones were placed into sterile culture. IR-1 now has 438 clones in vitro. A total of 557 tests were performed on these and other IR-1 stocks to monitor the presence of

viruses and PSTV (potato spindle tuber viroid) in the Collection. The in vitro and virus testing program was moved to Sturgeon Bay from Madison.

Germination percentages of 600 seedlots were determined.

New foreign varieties were planted in the greenhouse for seed increase. Tubers were planted in sand over soil, and the sand removed when roots were established in the soil. This allowed removal of stolons to prevent tuberization and encourage flowering. This technique was effective for only a few of the varieties.

Accession records for 323 recent collections were submitted for PI assignment.

Several improvements were made to the seed increase and processing routine this year. Side benches were added to the Quonset greenhouse. This increased usable space in this greenhouse by about 60% for a cost of under \$500. Fail-safes were added to seed and tuber storage as well as the greenhouse heating system. A 100-seed sample of the entire seed collection is being prepared for storage at a second site. Backup thermostats were added to both tuber storages to prevent them from freezing should the main thermostats fail. An effective scheme for supplying power to open the greenhouse steam valves in a power outage was devised and installed by IR-1 staff at a cost of about \$1,000 less than professional estimates. A prototype semi-automatic watering system was installed in one greenhouse. It works so well that plans have been made to automate watering in all houses as much as possible. A relatively small investment will allow better use of the thousands of dollars currently spent each year as time spent watering.

An experiment was conducted comparing fall increase families sprayed biweekly with a solution containing boron and gibberellin to controls. Treatment plants produced noticeably more foliage, but no obvious differences in flowering were seen. Seed production is yet to be tabulated. This preliminary experiment was done on a fall increase of atypical species, so it needs further investigation. Observations have suggested that flowering and seedset are improved when cuttings from mature plants are grown for seed increase (in contrast to rearing seedlings directly). An experiment to systematically assess this phenomenon has been initiated. An experiment was conducted to characterize the rate of seed

drying accomplished by the methods used at IR-1. It appears that the one-month drying time over K-acetate employed is effective for slowly reducing the percent moisture to about 5%.

Accessions reported to be resistant to diseases targeted for "fine screening" were planted and increased by cuttings. Tubers from these cuttings will provide replication at the genotype level. It is hoped that funds will be available to facilitate screening which will characterize the nature of resistance within resistant accessions and identify clones with the strongest and most consistant resistance. These will then be evaluated for ability to transmit their resistance to their offspring.

Classification

Over 1,200 plots were planted this summer for taxonomic assessment and for use as herbarium specimens. Dr. Spooner was joined by Drs. J. G. Hawkes and R. G. van den Berg, and Mr. Aaron Rodriguez-C. in taxonomic examination of these plantings. Over 400 new herbarium specimens were prepared. About 100 additional mounts were made. Steady progress is being made toward the goal of a herbarium representation of each accession in the Collection. Computer databases were prepared for recent Mexican and Bolivian collections. Complete herbarium labels were printed from these and organized such that they will be immediately available as needed for new specimens. A total of well over 5,000 sheets, representing nearly 115 potato species, are now available in the IR-1 herbarium for taxonomic study.

Distribution of Stocks

Shipments of seed, tuber, and in vitro stocks were sent to potato workers in 21 states of the United States and to workers in 19 other countries in response to requests. The volume and types of stocks sent to various consignee categories is summarized in the table below:

Volume and Types of Stocks Distributed

Category	Units ¹						Total Accessions	
	S	TF	TC	IVS	RPS	Other	Total	
Domestic	3,264	1,118	281	444	1,042	5	6,154	5,640
Foreign	1,142	624	29	26	1	43	1,865	1,724
IR-1 use ²	2,473	0	1,048	0	0	557	4,078	4,078
Total	6,879	1,742	1,358	470	1,043	605	12,097	11,442

^{1/} Types of Stocks sent/(Number of seeds, tubers or plantlets per standard shipping unit): S=True Seeds/(50), TF=Tuber Families/(10), TC=Tuber Clones/(4), IVS=in

vitro Stocks (1), RPS=USDA-WI Cooperative Research Program Stocks, Other=plants, herbarium specimens, pollen, demonstration/teaching materials, leaf samples. Some shipments contained more than one unit per accession.

- 2/ Includes chromosome counts, germination tests, ID and taxonomic check plantings, in vitro maintenance, seed increases, PSTV tests, research and miscellaneous plantings.

The tuber family orders listed above were requested from a listing of 245 accessions mailed to approximately 350 cooperators world-wide. Tuber families propagated for 1989 distribution were reduced from the usual 21 clones per accession to 10 clones per accession. This allowed the offering of a diverse sample of species and accessions while saving greenhouse space needed for seed increases. The usefulness of tuber families was assessed by sending a questionnaire to all domestic cooperators. Of nearly half who responded, about 85% said discontinuation of tuber families would result in significant inconvenience to their research programs.

Domestic Distributions by Region

Region	Units		Orders	
	shipped	% of total	shipped	% of total
North Central	3,986	65	46	51
North Eastern	986	16	20	22
Southern	75	1	8	9
Western	1,107	18	16	18
Total	6,154	100	90	100

Over 3,850 incorrect or incomplete accession records from the GRIN database were updated on the Project PC. These records have been sent back to Beltsville for reloading into GRIN. All GRIN potato taxonomy was updated on-line. Electronic order processing was implemented in 1989. To avoid communication expenses, a local DBASE III and MultiMate system was developed to satisfy GRIN data format requirements. All requestor and order-related data is generated and printed on-site from a local inventory database unloaded from GRIN. Order data records are then periodically reloaded into GRIN. A second Telex was acquired by the Project with USDA, ARS Area year-end funds.

DBASE III files containing all miscellaneous IR-1 stocks have been prepared. Many of these are clones requiring expensive in vitro or yearly tuber maintenance. The IR-1 Technical Committee made decisions on which of these stocks should be retained in the Collection at its June meeting using responses from questionnaires sent to IR-1 cooperators. Since National Plant Germplasm System (NPGS) policy apparently precludes discarding PI's, however, a contingency plan for maintenance of these stocks is being developed. When complete and approved, efforts to publish a "Miscellaneous Stocks" inventory will proceed.

About 50 copies of the "Inventory of tuber-bearing Solanum species" and lists of stocks available in vitro were sent in response to requests. Fifty-two new cooperator names were added to the IR-1 mailing list in 1989.

Evaluation of Stocks

Funds for continuation of a second year of Rhizoctonia screening by Dr. Clapham, USDA, ARS, Orono, ME were provided by USDA, ARS in 1989.

The Collection is steadily being evaluated for characteristics of economic importance through the research efforts of state, federal, and foreign laboratories.

Usefulness of Findings

The major objective of the Inter-Regional Potato Introduction Project is to promote and facilitate potato research and breeding by providing a readily available reservoir of germplasm. The success of IR-1 may be measured by the use of introduced germplasm in the pedigrees of new varieties and in research publications.

Recent varietal releases Eramosa, Gemchip, IditaRed, Kanona, NemaRus and Somerset all have at least two foreign introductions in their pedigrees, as is the case with 188 of 194 varieties released in the United States since 1932. All but IditaRed are known to contain contributions of non-tuberosum germplasm.

Research conducted in the United States and other countries provide evidence of the importance of continued utilization of the IR-1 germplasm collection. During 1989, 86 papers, 36 abstracts, and 14 theses reported the use of Solanum introductions.

1989 NORTH CENTRAL REGIONAL POTATO TRIALS

R. H. Johansen and Cooperators^{1/}

The North Central Regional Potato Variety Trials have been conducted for the past 39 years. This past season there were 16 states and provinces conducting trials, however the trial at Alberta was lost due to disease.

Cultivars Released in 1989:

Selection				
Year	Name	Number	Parentage	Released by:
1989	Niska	W848	Wischip x B5141-6	Alberta-Wisc.
1989	LaBelle	La01-38	B5461-4 x B5141-6	Louisiana
1989	Spartan Pearl	MS700-83	Atlantic x Michibonne	Michigan
1990	Snowden	W855	B5141-6 x Wischip	Wisconsin

Cooperating States and Provinces:

State or Province	Date Planted	Date Harvested	Total Days to Harvest
Trial Lost to Disease			
Alberta			
Manitoba	5/17	9/13	120
Ontario	5/16	9/21	127
Indiana	4/19	8/8	81
Iowa	4/26	7/31	68
Kentucky	4/14	9/27	167
Louisiana	2/24	6/13	110
Michigan	5/3	9/19	140
Minnesota	4/19	8/19	123
Missouri	3/27	8/15	142
Nebraska	5/22	9/23	125
New Jersey	----	----	---
North Dakota	5/16	9/18	126
Ohio	5/19	9/14	119
South Dakota	5/1	9/27	122
Wisconsin	4/28	9/26	152

Environmental Conditions: Soil types ranged from loam to sand, however most soil types were of the silt to sandy loam type. Several locations used irrigation.

^{1/} Alberta, Mr. Clive Schaupmeyer; Manitoba, Mr. Brian Rex; Ontario, Mr. Gary Johnston; Indiana, Dr. Hommer Erickson; Iowa, Dr. Bill Summers; Kentucky, Dr. John Snyder; Louisiana, Dr. James Fontenot; Michigan, Dr. Richard Chase; Minnesota, Dr. Florian Lauer; Missouri, Dr. V. N. Lambeth; Nebraska, Dr. Alexander D. Pavlista; Ohio, Dr. Mark A. Bennett; South Dakota, Dr. Paul Prashar; Wisconsin, Mr. Donald Kichefski, Dr. Stan Peloquin.

Cultural Practices: Fertilizer, insecticides, herbicides, vine killers, etc. were all based on local conditions. Insecticides used were Thiodan, Sevin, Malathion, Thimet, Asana, Decis, Imidan + PBO, Cygon, Pounce, Pydrin, Rotonone, Vydate L, Furadan, Guthion. Fungicides used were Bravo, Dithane M45, Flotin, Mancozeb. Herbicides used were Gramotone, Lorax, Dual, Lexone, Surflan, Prowl, Eptam. Vines were killed mechanically or by Reglone and Diquat + surfactant.

Weather Conditions: In general it was quite warm and dry throughout the Midwestern part of the United States and Canada. Rainfall was normal in Kentucky, however it was dry in Nebraska. Temperatures were normal in New Jersey and it was hot and dry in North Dakota and South Dakota especially during the latter part of the season. New Jersey had the wettest season on record. Louisiana had temperatures too high for good potato production. Ohio had hard, beating rains early in the season which compacted the soil. Temperatures in Michigan were not much above 80°F during the season and rainfall was good in June and August.

Entries: Entries were received from Michigan, North Dakota, Wisconsin, Minnesota and Nebraska. North Dakota again supplied the check varieties Norchip, Norland, Red Pontiac, Russet Burbank and Norgold Russet.

Total and U.S. No. 1 Yield: As usual, Red Pontiac was again the highest yielding entry in both total and U.S. No. 1 yield. Other high yielding selections were MS700-70, NEA22.75-1, ND1538-1Russ and W1005. Highest yields were found in Minnesota and Wisconsin; Ohio and Manitoba had the lowest yield (North Central Regional Tables 1 and 2).

Percent U.S. No. 1: The selections NEA22.75-1, Red Pontiac and MS700-70 had the highest average percent U.S. No. 1, however differences between these selections and several others were not very great. The only selections that appeared to have a low percent U.S. No. 1 were MN 13420 and Russet Burbank (North Central Regional Table 3).

Maturity: As shown in North Central Regional Table 4, Norland was the earliest maturing entry while Russet Burbank was the latest. Other early maturing entries were ND1196-2R, ND2224-5R and MN 13451.

Percent Total Solids: The highest total solids entries were W855 and MS700-7. Both were higher in solids than the check variety, Norchip. Norland, Red Pontiac and ND2224-5R were the

lowest in total solids (North Central Regional Table 5). Manitoba, Nebraska and South Dakota produced the highest total solids and Kentucky produced the lowest.

Scab Reaction: Little scab was found except for Minnesota, Indiana and Wisconsin. North Central Regional Table 6 indicates the average scab found for each entry or selection and each location. Some selections, such as BN9826-1 and ND2224-5R appeared to be quite susceptible to scab.

Summary of Grade Defects: Grade defects varied from location to location. Indiana reported some scab and internal necrosis. Minnesota and New Jersey also reported severe internal necrosis. Kentucky and Missouri reported severe growth cracks. Grade defects are found in North Central Regional Table 7. Certain entries are starred (*) to indicate a weakness of a cultivar or selection.

Chip Color: Chip color is found in North Central Regional Table 8. The best chipping selections were W855, MS700-70, MN 135⁴⁵ and MN 13451. These selections were equal to or better than Norchip, however, it should be noted that the chip tests were done on field-harvested potatoes (before they were put in cold storage). No data is available from this trial as to how they reconditioned after cold storage.

Early Blight Readings: Michigan was the only cooperator that reported early blight (North Central Regional Table 9).

Overall Merit Ratings: Merit ratings for all locations in 1989 are found in North Central Regional Table 10. The chart below shows the top six selections, listed in order of ranking, with MS700-70 receiving the highest rating. Lines NEA22.75-1 and W1005 were tied for third place. For comparison the following shows merit ratings for the years 1987, 1988 and 1989.

Selection	Total Points		
	1987	1988	1989
MS700-70	18	0	37
W855	0	17	34
NEA22.75-1	0	0	24
W1005	0	0	24
ND2224-5R	0	23	19
ND1538-1Russ	0	0	17

North Central Regional Trial Table 1. Total Yield (Cwt/Acre) - 1989.

Cultivar or Selection	Man.	Ont.	IN	IA	KY	LA	MI	MN	MO	NE	NJ	ND	OH	SD	WI	Ave.
Early to Medium Early																
Norland	139	262	254	265	257	200	348	427	147	222	220	242	159	209	449	253.3
Norgold Russet	130	194	404	243	303	143	352	427	163	359	308	240	125	211	475	271.8
Norchip	102	266	411	203	319	180	390	489	249	275	283	249	124	272	455	284.5
ND1196-2R	94	286	399	230	236	138	384	531	178	191	228	238	56	263	563	267.7
Medium Late to Late																
MN13420	105	225	341	306	328	150	409	567	175	374	236	271	100	323	533	296.2
MN13451	48	86	289	183	309	83	361	ND	161	OUT	146	175	52	207	457	196.7
MN13545	101	198	303	257	288	55	324	469	137	153	256	225	ND	NS	481	249.8
MS700-70	61	293	352	224	395	163	559	624	210	367	350	191	59	272	445	304.3
NEA219.70-3	104	171	361	221	281	203	425	508	243	290	214	230	156	240	490	275.8
NEA22.75-1	110	239	194	285	291	210	483	598	290	229	331	263	118	439	636	314.4
BN9826-1	65	308	269	218	326	155	NS	438	184	176	281	179	93	309	463	247.4
ND2224-5R	124	216	216	270	261	188	389	527	166	SR	319	275	32	276	518	269.8
ND1538-1Russ	122	270	461	229	285	163	420	583	182	SR	340	268	104	298	626	310.8
W855	72	212	340	219	288	263	423	545	229	283	255	188	53	298	536	280.3
W1005	116	306	475	253	343	108	461	612	336	260	384	215	116	474	632	339.4
Red Pontiac	117	355	512	309	389	278	598	663	285	336	435	253	173	408	798	393.9
Russet Burbank	95	294	417	214	336	230	520	551	236	275	361	168	119	327	622	317.7
Average	100	246	353	243	308	171	428	535	210	271	291	228	102	302	540	

ND = No data reported

SR = Seed rotted

NS = No seed was received.

North Central Regional Trial Table 2. U.S. No. 1 Yield (Cwt/Acre) - 1989.

Cultivar or Selection	Man.	Ont.	IN	IA	KY	LA	MT	MN	MO	NE	NJ	ND	OH	SD	WI	Ave.
Early to Medium Early																
Norland	104	216	ND	243	201	123	287	371	119	206	196	226	116	165	422	213.9
Morgold Russet	75	143	ND	222	232	85	222	361	98	329	147	199	65	136	418	195.1
Norchip	44	201	ND	184	248	115	295	430	210	252	231	174	62	209	413	210.9
ND1196-2R	45	212	ND	209	184	75	286	456	137	153	200	220	ND	212	514	223.3
Medium Late to Late																
MN13420	41	167	ND	260	259	88	262	488	108	344	173	231	39	240	476	226.9
MN13451	28	57	ND	110	233	43	232	ND	102	ND	110	142	ND	129	395	143.7
MN13545	50	132	ND	209	198	23	195	391	87	122	192	184	ND	NS	423	183.8
MS700-70	36	226	ND	212	336	110	497	568	178	351	334	165	ND	229	421	281.8
NEA219-70-3	72	140	ND	209	220	120	364	478	198	275	168	209	81	216	479	230.6
NEA22-75-1	88	210	ND	259	250	165	443	569	251	214	302	250	76	125	614	294.0
BN9826-1	36	246	ND	201	278	108	NS	393	149	153	200	142	43	240	435	201.9
ND2224-5R	91	121	ND	243	215	103	318	474	104	SR	285	255	ND	218	468	241.5
ND1538-1Russ	70	228	ND	204	241	98	304	509	136	SR	210	212	29	227	599	235.9
W855	19	151	ND	196	214	165	349	493	188	252	220	159	ND	240	498	241.9
W1005	54	172	ND	185	305	83	351	501	241	229	255	167	42	390	569	253.1
Red Pontiac	93	319	ND	285	322	185	541	619	234	329	363	228	85	372	775	339.3
Russet Burbank	29	121	ND	166	277	113	312	338	186	237	132	64	18	176	562	173.6
Average	57	180	ND	212	248	106	329	465	160	246	219	190	60	239	499	

ND - No data reported

NS - No seed

SR - Seed rotted

North Central Regional Trial Table 3. Average percent U.S. No. 1 (over 2" diameter) - 1989

Cultivar or Selection	Man.	Ont.	IN	IA	KY	LA	MI	MN	MO	NE	NJ	ND	OH	SD	WI	Ave.
Early to Medium Early																
Norland	74	82	ND	91	74	62	82	87	81	89	73	79	94	82.4		
Norgold Russet	58	67	ND	91	76	59	63	85	60	48	52	64	88	70.4		
Norchip	43	76	ND	91	77	64	75	88	84	81	50	77	91	75.6		
ND1196-2R	48	74	ND	91	77	54	74	86	77	80	ND	81	91	77.9		
Medium Late to Late																
MN13420	39	74	ND	85	77	59	52	64	64	86	71	71	74	89	70.5	
MN13451	58	66	ND	81	75	68	42	60	63	62	ND	62	62	88	67.1	
MN13545	50	66	ND	94	84	84	89	91	85	95	75	ND	ND	88	69.9	
MS700-70	59	77	ND	94	79	59	86	88	94	95	95	91	84	95	84.9	
NEA219-70-3	69	82	ND	91	79	79	92	92	95	95	79	91	95	98	82.1	
NEA22-75-1	80	88	ND	91	86	79	70	NR	90	81	87	71	97	97	88.2	
BN9826-1	55	82	ND	92	85	85	70	85	82	90	90	90	78	78	77.7	
ND2224-5R	73	56	ND	90	83	55	82	90	63	87	SR	93	79	80	78.8	
ND1538-1Russ	57	84	ND	89	85	60	72	75	75	87	62	79	28	76	73.1	
W855	26	71	ND	89	74	63	82	90	82	89	86	85	81	81	77.8	
W1005	47	56	ND	73	89	77	76	82	72	88	66	78	36	82	72.3	
Red Pontiac	79	90	ND	92	79	67	90	93	82	98	83	90	49	91	84.3	
Russet Burbank	31	41	ND	77	81	49	60	61	79	86	36	38	15	54	61.4	
Average	56	73	ND	87	79	61	76	87	75	90	75	82	45	78	72	

ND - No data reported

NR - No seed was received

SR - Seed rotted

North Central Regional Trial Table 4. Maturity Classification^{1/} - 1989

Cultivar or Selection	Man.	Ont.	IN	IA	KY	LA	MI	MN	MO	NE	NJ	ND	OH	SD	WI	Ave.
<u>Early to Medium Early</u>																
Norland	2.5	ND	ND	1.0	2.0	1.0	1.5	2.0	1.0	1.0	3.0	1.0	1.0	ND	1.5	
Norgold Russet	2.8	ND	ND	3.0	2.8	4.0	2.5	3.0	2.5	3.0	3.5	3.0	2.0	ND	2.9	
Norchip	3.0	ND	ND	3.0	2.8	4.0	3.0	4.0	3.0	3.0	3.8	4.0	2.5	ND	3.3	
ND1196-2R	2.0	ND	ND	2.0	1.3	1.0	3.0	3.0	1.0	1.0	2.8	1.0	2.5	ND	2.0	
<u>Medium Late to Late</u>																
MN13420	3.5	ND	ND	4.0	1.5	1.0	3.5	3.0	3.5	2.0	2.0	4.8	1.0	ND	2.7	
MN13451	2.5	ND	ND	3.0	1.8	1.0	3.5	ND	3.5	3.0	1.0	3.8	2.0	3.0	ND	2.6
MN13545	2.8	ND	ND	3.0	1.8	1.0	3.5	4.0	3.5	3.0	1.0	4.0	ND	NS	ND	2.8
NS700-70	3.8	ND	ND	4.0	4.3	4.0	4.5	5.0	5.0	3.0	4.0	4.0	4.0	ND	4.0	
NEA219-70-3	2.5	ND	ND	3.0	3.3	4.0	3.5	4.0	2.5	2.0	2.0	3.0	2.0	2.5	ND	2.9
NEA22-75-1	3.5	ND	ND	3.0	2.5	4.0	4.0	5.0	3.0	4.0	4.0	4.5	3.0	ND	3.6	
BN9826-1	3.8	ND	ND	3.0	4.5	5.0	ND	5.0	3.0	3.0	5.0	4.5	4.0	ND	4.0	
ND2224-5R	2.8	ND	ND	3.0	1.0	1.0	3.5	3.0	ND	1.0	3.0	3.0	3.0	ND	3.0	
ND1538-1Russ	3.0	ND	ND	3.0	3.5	4.0	3.5	4.0	4.0	ND	2.0	3.0	2.0	3.5	ND	3.2
W855	2.8	ND	ND	3.0	4.8	4.0	4.0	5.0	3.0	3.0	4.0	3.8	4.0	3.0	ND	3.7
W1005	4.3	ND	ND	4.0	3.8	4.0	4.0	5.0	4.0	4.0	5.0	5.0	5.0	3.5	ND	4.3
Red Pontiac	4.0	ND	ND	3.0	4.5	4.5	3.0	3.0	4.0	4.0	3.5	5.0	5.0	ND	3.8	
Russet Burbank	4.0	ND	ND	5.0	4.3	5.0	5.0	5.0	4.5	3.0	5.0	5.0	5.0	5.0	ND	4.7
Average	3.2	ND	ND	3.1	2.9	3.0	3.6	3.9	3.2	3.0	2.8	3.8	3.1	3.0	ND	

- ^{1/} 1. Very Early - Norland Maturity
 2. Early - Irish Cobbler Maturity
 3. Medium - Red Pontiac Maturity
 4. Late - Katahdin Maturity
 5. Very Late - Russet Burbank Maturity
- NS - No seed was received
 ND - No data reported

North Central Regional Trial Table 5. Percent Total Solids - 1989.

Cultivar or Selection	Man.	Ont.	IN	IA	KY	LA	MI	MN	MO	NE	NJ	ND	OH	SD	WI	Ave.
<u>Early to Medium Early</u>																
Norland																
Norgold Russet	20.3	15.8	13.7	14.2	13.3	16.0	15.4	15.0	14.3	19.4	14.1	18.0	12.6	18.4	14.1	15.6
Norchip	22.5	14.5	14.1	16.1	15.8	16.5	16.7	15.6	15.6	19.7	15.4	18.8	13.6	19.9	16.7	16.8
ND1196-2R	23.0	18.6	16.9	17.5	18.8	19.0	17.3	18.2	22.2	17.7	20.1	14.6	21.8	19.4	18.8	18.8
20.8																
<u>Medium Late to Late</u>																
MN13420	22.5	16.5	15.0	15.2	15.0	15.0	15.0	15.8	16.2	21.2	15.2	18.2	13.4	20.5	15.8	16.7
MN13451	22.8	16.7	15.8	16.2	13.3	16.2	16.9	ND	16.5	16.0	15.2	18.8	12.8	21.6	17.3	17.0
MN13545	22.5	17.5	14.3	16.3	13.3	17.5	17.1	16.2	15.2	23.1	15.2	19.0	NS	NS	16.5	17.2
MS700-70	25.0	19.4	16.7	19.3	18.0	18.4	21.6	20.3	18.0	22.9	19.7	20.1	14.2	22.6	21.6	19.9
NEA219,70-3	22.0	17.1	14.5	15.4	15.2	15.4	18.2	17.3	16.0	20.7	15.2	18.4	13.8	20.3	18.8	17.2
NEA22.75-1	24.3	16.9	13.9	15.2	13.3	15.6	17.3	16.9	15.8	20.3	14.8	19.4	13.4	20.5	16.5	16.9
BN9826-1	23.0	20.1	14.5	17.0	16.5	14.8	17.1	15.4	21.8	16.9	18.2	13.8	21.6	16.9	17.7	17.7
ND222L-5R	20.0	17.5	13.3	14.4	13.3	15.2	15.4	15.2	15.0	SR	13.3	16.7	11.4	18.4	14.5	15.3
ND15338-1Russ	23.3	17.3	14.1	14.9	13.3	15.0	17.3	15.6	15.4	SR	14.3	19.0	14.6	20.7	17.1	16.6
W855	24.3	18.4	17.9	18.6	18.0	19.2	20.7	20.3	19.9	22.9	18.8	21.4	15.8	20.7	20.7	19.8
W1005	22.5	19.0	15.6	16.5	16.0	17.5	20.3	18.2	17.1	20.7	17.5	20.1	15.8	22.8	20.9	18.7
Red Pontiac	20.0	15.0	13.5	14.4	13.3	14.8	16.0	15.2	14.3	20.1	13.3	17.3	14.6	19.7	16.0	15.8
Russet Burbank	22.8	19.4	16.3	17.1	16.5	17.7	19.9	18.8	16.9	19.2	18.2	14.0	22.6	20.1	18.6	18.6
Average																
	22.5	17.4	15.0	16.1	14.9	16.5	17.7	16.9	16.2	20.9	15.8	18.8	13.9	20.8	17.5	

NS - No seed was received

SR - Seed rotted

ND - No data reported

North Central Regional Trial Table 6. Scab Reaction Report. Most Representative Scab (Area-Type) 1/ - 1989.

Cultivar or Selection	Man.	Ont.	IN	IA	KY	LA	MI	MN	MO	NE	NJ	ND	OH	SD	WI
<u>Early to Medium Early</u>															
<u>Medium Late to Late</u>															
Norland	0-0	ND	3-2	T-1	T-1	0-0	0-0	2-2	0-0	T-1	0-0	T-1	0-0	0-0	2-2
Norgold Russet	0-0	ND	2-1	0-0	T-1	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	1-2
Norchip	0-0	ND	4-2	T-1	T-1	0-0	0-0	2-2	0-0	T-5	0-0	T-1	0-0	0-0	2-2
ND1196-2R	0-0	ND	3-3	T-1	T-1	0-0	0-0	4-3	0-0	T-2	0-0	T-1	0-0	0-0	0-0
MN13420	0-0	ND	3-4	T-1	T-1	0-0	0-0	3-3	0-0	T-1	0-0	T-2	0-0	0-0	0-0
MN13451	0-0	ND	2-3	1-2	T-1	0-0	0-0	ND	0-0	ND	0-0	T-1	0-0	0-0	0-0
MN13545	T-1	ND	4-3	2-3	T-1	0-0	0-0	3-2	0-0	0-0	0-0	T-1	0-0	0-0	0-0
MS700-70	0-0	ND	4-2	1-2	T-1	0-0	0-0	2-4	0-0	T-3	0-0	T-1	0-0	0-0	3-2
NEA219.70-3	0-0	ND	3-2	T-1	T-1	0-0	0-0	2-2	0-0	1-3	0-0	T-1	0-0	0-0	1-2
NEA22.75-1	0-0	ND	4-1	0-0	T-1	0-0	0-0	2-3	0-0	0-0	0-0	1-1	0-0	0-0	3-2
BN9826-1	0-0	ND	4-3	0-0	T-1	0-0	0-0	NS	4-5	0-0	T-1	0-0	0-0	0-0	0-0
ND2224-5R	0-0	ND	2-3	T-1	T-1	0-0	0-0	5-5	0-0	SR	0-0	T-1	0-0	0-0	2-3
ND1538-1Russ	0-0	ND	2-2	0-0	T-1	0-0	0-0	3-2	0-0	SR	0-0	0-0	0-0	0-0	0-0
W855	0-0	ND	2-2	0-0	T-1	0-0	0-0	4-5	0-0	T-1	0-0	T-1	0-0	0-0	0-0
W1005	0-0	ND	0-0	0-0	T-1	0-0	0-0	2-2	0-0	0-0	0-0	0-0	0-0	0-0	0-0
Red Pontiac	1-1	ND	3-2	0-0	T-1	0-0	0-0	4-5	0-0	T-4	0-0	2-1	0-0	0-0	2-4
Russet Burbank	0-0	ND	2-2	T-1	T-1	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0	0-0

1/ AREA

T = less than 1%

1 = 1-20%

2 = 21-40%

3 = 41-60%

4 = 51-80%

5 = 81-100%

TYPE

1 = Small, superficial

2 = Larger, superficial

3 = Larger, rough pustules

4 = Larger pustules, shallow eyes

5 = Very large pustules, deep holes

ND - No data reported

NS - No seed was received

SR - Seed rotted

North Central Regional Trial Table 7. Summary of Grade Defects - 1989.

Cultivar or Selection	Scab	Cracks	Growth Growth	Off Shape	External			Internal			Total Vascular Diseases	Total Free of Int. Def.
					& Second	Tuber Rot	Sun Green	Total Free of 1/ Ext. Defects	Hollow Heart	Necrosis		
<u>Early to Medium Early</u>												
Norland	5.1	2.0	2.6	0.8	2.1	87.7	0.9	2.1	3.9	3.1	3.5	93.4
Norgold Russet	1.0	2.4	7.4	0.4	1.4	88.3	1.1	1.1	6.0	8.6	6.0	95.0
Norchip	7.4	5.3*	8.7*	0.5	3.9	77.9	0.0	4.9	3.3	4.9	3.3	81.4
ND1196-2R	8.5	2.0	1.6	0.7	1.4	87.5	0.4					91.4
<u>Medium Late to Late</u>												
MN13420	8.7	4.7	7.2	1.4*	0.3	76.4	0.0	2.2	5.3	5.3	3.5	92.7
MN13451	7.5	1.2	8.0	0.1	1.4	82.6	0.0	0.2	3.5	3.5	3.5	96.4
MN13545	9.9	0.5	3.5	0.2	3.2	83.8	0.7	4.0	7.8	7.8	7.8	81.8
MS700-70	4.9	1.3	1.9	0.3	3.6	82.9	5.0*	4.7	3.6	3.6	3.6	85.3
NEA219.70-3	5.7	3.8	4.9	0.5	3.5	84.4	1.3	6.3	6.0	6.0	6.0	87.3
NEA22.75-1	4.2	1.9	2.8	0.5	1.6	89.8	3.7	9.1	4.9	4.9	4.9	83.6
BN9826-1	7.4	4.7	6.8	0.6	3.6	72.1	2.6	12.6*	8.2*	8.2*	8.2*	78.1
ND222-4-5R	11.4*	0.7	1.1	1.9*	2.2	83.7	1.2	1.1	4.5	4.5	4.5	83.6
ND1538-1Russ	1.1	3.2	9.6*	0.3	0.8	86.1	0.6	0.6	3.6	3.6	3.6	95.8
W855	4.4	0.6	1.3	0.5	1.7	91.9	4.9*	2.5	7.7	7.7	7.7	84.9
W1005	0.6	5.6*	8.1*	1.3*	0.7	86.1	3.1	6.5	2.7	2.7	2.7	88.4
Red Pontiac	6.8	4.0	8.5*	0.9	1.0	80.9	2.4	0.8	8.7*	8.7*	8.7*	89.0
Russet Burbank	2.6	10.8*	35.3*	0.4	0.2	59.4	1.9	3.1	5.0	5.0	5.0	90.5

1/ Percent normal tubers showing no defects (same individuals had more than one type of defect).

* Possible weakness of cultivar or clone.

North Central Regional Trial Table 8. Chip Color - 1989.

Cultivar or Selection	Man. 2/ Ont. 2/	IN ^{1/}	IA	KY ^{1/}	LA ^{1/}	MI ^{2/}	MN	MO ^{2/}	NE ^{2/}	NJ ^{1/}	ND ^{2/}	OH ^{1/}	SD	WI ^{1/}	
<u>Early to Medium Early</u>															
Norland															
Norgold Russet	58	70	4	ND	3	5	55	ND	53	7	38	4	ND	7	
Norchip	43	40	4	ND	4	9	33	ND	55	6	26	4	ND	9	
ND1196-2R	64	70	1	ND	3	3	59	ND	65	5	44	3	ND	5	
	53	70	2	ND	4	7	53	ND	58	6	33	3	ND	8	
<u>Medium Late to Late</u>															
MN13420	47	60	3	ND	3	8	56	ND	54	6	29	3	ND	9	
MN13451	61	—	2	ND	3	5	61	ND	65	4	40	3	ND	4.2	
MN13545	67	70	1	ND	1	5	64	ND	63	5	49	ND	ND	5	
MS700-70	58	70	1	ND	2	5	56	ND	65	38	5	37	3	ND	5.5
NEA219.70-3	61	65	2	ND	3	4	60	ND	65	35	5	47	4	ND	4.5
NEA22.75-1	45	50	5	ND	4	9	38	ND	54	30	6	27	3	ND	7
BN9826-1	50	60	5	ND	3	9	NS	ND	50	40	7	27	4	ND	7
ND2224-5R	51	70	4	ND	3	7	55	ND	60	SR	6	35	4	ND	8
ND1538-1Russ	45	50	3	ND	4	7	55	ND	54	SR	4	27	4	ND	6
W855	63	70	1	ND	2	5	63	ND	65	49	4	43	3	ND	3.4
W1005	50	60	4	ND	3	8	54	ND	65	53	7	36	4	ND	5.5
Red Pontiac	36	55	5	ND	5	9	37	ND	45	ND	8	20	2	ND	9
Russet Burbank	39	70	4	ND	4	6	57	ND	50	38	7	31	4	ND	6
Average	52	63	3	ND	3	7	54	ND	58	41	6	35	3	ND	6

^{1/} PCII Color Chart (1 = lightest; 10 = darkest)^{2/} Agtron (Highest number lightest) - Michigan and Nebraska used Agtron E-10

ND - No data reported

NS - No seed received

SR - Seed rotted

North Central Regional Trial Table 9. Early Blight^{1/} - 1989

Cultivar or Selection	Man.	Ont.	IN	IA	KY	LA	MI	MN	MO	NE	NJ	ND	OH	SD	WI
<u>Early to Medium Early</u>															
<u>Early to Medium Late to Late</u>															
Norland	0	0	0	0	0	0	2.5	0	0	0	0	0	0	0	0
Norgold Russet	0	0	0	0	0	0	3.5	0	0	0	0	0	0	0	0
Norchip	0	0	0	0	0	0	3.5	0	0	0	0	0	0	0	0
ND1196-2R	0	0	0	0	0	0	3.0	0	0	0	0	0	0	0	0
MN13420	0	0	0	0	0	0	2.5	0	0	0	0	0	0	0	0
MN13451	0	0	0	0	0	0	2.5	0	0	0	0	0	0	0	0
MN13545	0	0	0	0	0	0	3.0	0	0	0	0	NS	NS	0	0
MS700-70	0	0	0	0	0	0	4.0	0	0	0	0	0	0	0	0
NEA219.70-3	0	0	0	0	0	0	3.0	0	0	0	0	0	0	0	0
NEA22.75-1	0	0	0	0	0	0	4.0	0	0	0	0	0	0	0	0
BN9826-1	0	0	0	0	0	0	NS	0	0	0	0	0	0	0	0
ND2224-5R	0	0	0	0	0	0	3.5	0	0	0	0	0	0	0	0
ND1538-1Russ	0	0	0	0	0	0	3.0	0	0	0	0	0	0	0	0
W855	0	0	0	0	0	0	4.0	0	0	0	0	0	0	0	0
W1005	0	0	0	0	0	0	4.5	0	0	0	0	0	0	0	0
Red Pontiac	0	0	0	0	0	0	4.0	0	0	0	0	0	0	0	0
Russet Burbank	0	0	0	0	0	0	4.5	0	0	0	0	0	0	0	0
Average	0	0	0	0	0	0	3.4	0	0	0	0	0	0	0	0

ND = No data reported
 NS = No seed received
 SR = Seed rotted

North Central Regional Trial Table 10. Merit Ratings - 1989/

Cultivar or Selection	MAN.	CONT.	IN	IA	KY	LA	MI	MN	MO	NE	NJ	ND	OH	SD	WI	TOTAL
<u>Early to Medium Early</u>																
Norland																
Norgold Russet	5	ND	ND	2	1	1	1	1	1	3	1	3	1	1	10	3
Norchip		ND	ND		1				2							6
ND1196-2R		ND	ND	2	3							1	2			8
<u>Medium Late to Late</u>																
MN13420	ND	ND	ND						2		4					6
MN13451		ND	ND													2
MN13545		ND	ND													0
MS700-70	3	ND	ND	5	4	4	3	4	5	5	5					37
NEA219-70-3		ND	ND	1	3	3										4
NEA22-75-1	2	ND	ND	5	3	3			2							24
BN9826-1		ND	ND	4												4
ND2224-5R	3	ND	ND	2	1					3						19
ND1538-1Russ	1	ND	4		2	5				4						17
W855		ND	5		5	3			5	3						34
W1005		ND	1		5	4	1		4		1					24
Red Pontiac	4	ND	4													12
Russet Burbank		ND														0

Rating	Merit Ratings Points
1	5
2	4
3	3
4	2
5	1

ND = No data reported

WESTERN REGIONAL POTATO VARIETY TRIAL - 1989

J. J. Pavek, D. L. Corsini, and Cooperators^{1/}Uniform Potato
Yield Trial

The 1989 trial was grown at twelve locations for yield and two for disease data. It consisted of 19 entries, 14 experimental, four standard checks, and one additional early check. Three locations grew all the entries for early harvest as well as late harvest. The trial locations, dates of planting, vine killing, and harvest, and days from planting to harvest were as follows:

State	Location	Planting Date	Vine Kill Date	Harvest Date	Days to Harvest
California	Kern Co.	2/8	-	6/13	126
	Tulelake	5/8	-	9/19	135
Colorado	San Luis Vly	5/15	9/1	9/15	124
	Aberdeen	4/27	-	9/25	152
Idaho	Kimberly-Early	4/26	8/2	8/8	105
	Kimberly-Late	4/26	10/6	10/12	170
New Mexico	Clovis	4/6	8/3	8/8	125
	Farmington	4/25	8/17	8/21	119
Oregon	Hermiston-Early	4/8	7/25	8/9	121
	Hermiston-Late	4/18	9/13	10/16	182
"	Klamath Fls	5/19	9/12	9/18	122
	Malheur	5/11	10/8	10/11	155
Texas	Springlake	4/8	8/8	8/21	136
Washington	Othello - Early	4/4	7/31	7/31	119
	Othello - Late	4/12	9/7	9/11	153
"					
Prosser (Disease Data Only)					

Cultural practices and the use of fertilizer, herbicides, pesticides, and vine killing varied according to local conditions. Trial plots at all locations were irrigated on a regular schedule throughout the entire growing season according to plant needs. Early temperatures were above normal in the northern part of the region while the latter part of the season was about normal. The southern areas were mostly normal.

Data on vines, tubers, yield, internal quality, disease reactions, merit scores, and disposition are presented in Western Tables 1 through 7. Six russets (A7961-1, AC7869-17, A082283-1, A082611-7, BC0038-1, C07918-11) show promise for both processing and fresh use, while four russets (AC77101-1, AC81198-11, C08011-5, TND329-5RU) appear suited for fresh use only. Testing of the two reds (NDTX selections) for fresh use is continuing. The other two selections have been dropped.

^{1/}California, R. Voss, K. Brittan; Colorado, D. Holm; Idaho, S. Love, G. Kleinschmidt; New Mexico, N. Christenson, E.J. Gregory; Oregon, A. Mosley, D. Hane, K. Rykbost, C. Stanger, S. James; Texas, D. Smallwood, J. C. Miller; Washington, R. Thornton, W. Iritani, M. Martin, L. Mikitzel, C. Brown.

Western Table 1. 1989 Seed source, stand, tuber and vine characteristics, and foliar and tuber diseases.^{1/}

Entry	Seed Source	Stand (9 loc)	TUBERS		Vine Size	Mat	Vert Wilt	E. Blight		Scab	Leaf-roll NN
			Shape	Skin				Fol	Tuber		
A7816-14	OR	93	L	Rus	M	ML	MR	S	MS	R	S
A7961-1	OR	91	L	Rus	L	M	MS	S	S	R	MS-R
AC77101-1	OR	91	O	Rus	MS	ME	S	MS	R	MS-R	MS-R
AC7869-17	CO	93	O	Rus	ML	ME	S	S	MR	R	MS
AC81198-11	CO	92	O	Rus	ML	ML	S-MR	S	R	R	S-R
A081216-1	OR	94	L	Rus	L	ML	S-MR	MS	VS	R	MS
A082283-1	OR	88	O	Rus	L	ML	S	MS	R	S	MR
A082611-7	OR	94	L	Rus	M	ML	MS	S	R	R	MR
BC0038-1	CO	93	O	Wht	M	M	S	S	MR	S	VS-MS
C07918-11	CO	88	O	Rus	M	M	S	S	MR	S	MS
C08011-5	OR	84	O	Rus	M	ME	S-MR	MS	R	R	MR
TND329-1Ru	CA	92	L	Rus	M	ME	MS	MS	R	R	S
Lemhi Russet	OR	94	L	Rus	ML	ML	MS	VS	MR	R	MR
Russet Burbank	OR	95	L	Rus	ML	ML	MS	S	R	R	VS
Norgold Russet	OR	88	O	Rus	MS	E	S	S	MR	R	MR
NDTX8-731-JR	CA	92	R	Red	S	E	MS	S	MR	S	MS
NDTX9-1068-1IR	OR	83	R	Red	S	ME	S	S	S	S	S
Red LaSoda	ID	92	R	Red	ML	ML	MS	S	S	--	S
Shepody	ID	93	L	Wht	ML	M	S	S	--	S	MS

1/ Shape: O = oblong, L = long, R = round; Vine size: S = small, M = medium, MS = medium small, ML = medium large, Lrg = large; Mat (maturity): E = early, M = medium, L = late, ML = medium late, ME = medium early, ML = medium late; Disease reaction: R = resistant, S = susceptible, MR = moderately resistant, MS = moderately susceptible, VS = very susceptible; if two different reactions are shown, the first is for Prosser, the second for Aberdeen.

Western Table 2. 1989 Total tuber yield, cwt/acre. Full season and early harvest in parentheses, not included in entry mean.

Entry	Calif		Colo		Idaho		NMex		Oregon		Texas		Wash		Overall Mean
	Krn	Tul	SLV	Ab	C1v	Frm	Hrm	Klm	Mal	Spr	0th				
A7816-14	423	563	397	366	613 (213)	260	135	568 (313)	501	614	268	716	(450)	452	
A7961-1	390	460	338	---	---	352	122	430 (441)	377	442	364	681	---	398	
AC77101-1	415	633	412	407	483 (192)	344	155	524 (381)	474	441	354	729	(660)	449	
AC7869-17	397	406	387	407	513 (214)	353	70	494 (463)	409	408	410	699	(477)	413	
AC81198-11	---	540	444	404	601 (238)	451	147	680 (350)	457	460	428	817	(494)	492	
A081216-1	349	---	366	310	242 (85)	243	81	336 (183)	212	423	352	567	(359)	322	
A082283-1	410	---	466	418	641 (159)	394	85	661 (308)	472	510	442	801	(419)	490	
A082611-7	378	---	358	396	636 (250)	406	167	605 (421)	452	473	393	799	(457)	468	
BC0038-1	411	517	393	334	398 (293)	271	142	443 (389)	317	400	201	544	(438)	364	
C07918-11	---	460	341	372	480 (202)	295	132	537 (307)	394	396	269	792	(430)	405	
C08011-5	429	509	326	336	469 (197)	346	178	500 (206)	397	437	287	967	(590)	409	
TND329-1Ru	395	394	337	418	(280)	210	179	506 (334)	378	428	326	709	(500)	390	
Lemhi Russet	429	620	388	363	547 (169)	334	67	529 (267)	426	445	450	628	(470)	436	
Russet Burbank	441	557	411	406	542 (264)	353	148	591 (305)	559	492	473	740	(450)	476	
Norgold Russet	377	---	299	295	381 (294)	207	158	354 (473)	299	336	317	607	(435)	336	
NDTX8-731-1R	408	301	---	268	404 (338)	264	169	397 (436)	242	450	292	753	(552)	356	
NDTX9-1068-11R	431	494	394	456	591 (242)	434	206	471 (366)	426	548	382	994	(582)	486	
Red LaSoda	491	590	458	473	621 (256)	323	159	666 (459)	550	507	287	1010	(571)	511	
Shepody	469	---	---	---	---	(88)	---	---	(361)	---	344	---	---	(512)	406
Location Means	414	498	383	372	503 (221)	324	139	517 (351)	408	456	350	738	(492)	425	

Western Table 3. 1989 U.S. No. 1's, percent of total yield for locations; overall mean, percent and cwt/acre; early harvest in parentheses, not included in entry mean.

Entry	Calif			Colo			Idaho			NMex			Oregon			Texas			Wash		
	Krn	Tul	SLV	Ab	Kim	C1 v	1/	Frm	Hrm	Klm	Mal	Spr	0th	Wash	%	cwt/A					
A7816-14	82	88	75	87	66	(55)	50	62	68 (72)	72	66	64	53 (58)	70	315						
A7961-1	87	91	91	--	--	(--)	77	89	76 (78)	75	88	65	55 (--)	78	310						
AC77101-1	83	94	77	92	85	(56)	67	86	82 (91)	75	78	69	60 (72)	78	352						
AC7869-17	93	77	86	85	71	(66)	61	79	70 (84)	80	72	77	45 (62)	73	300						
AC81198-11	--	81	64	82	74	(70)	71	95	78 (78)	71	74	71	61 (63)	74	363						
A081216-1	87	--	73	77	71	(--)	49	45	76 (59)	66	78	53	61 (70)	70	226						
A082283-1	86	--	72	86	84	(23)	75	65	81 (81)	50	84	75	61 (64)	76	373						
A082611-7	90	--	73	82	75	(58)	65	71	76 (78)	75	79	61	70 (65)	75	353						
BC0038-1	90	86	82	82	76	(67)	55	85	81 (85)	69	79	67	62 (77)	77	279						
C07918-11	--	88	82	84	79	(53)	69	88	68 (75)	75	86	70	51 (54)	74	302						
C08011-5	83	91	82	91	84	(51)	72	86	85 (80)	74	77	67	69 (57)	79	326						
TND329-1Ru	94	90	89	88	80	(62)	55	84	82 (80)	85	88	63	72 (65)	81	316						
Lemhi Russet	93	90	79	85	84	(38)	65	81	72 (73)	69	87	76	75 (73)	80	349						
Russet Burbank	73	82	67	66	33	(39)	47	59	72 (55)	64	68	60	50 (32)	61	294						
Norgold Russet	96	--	77	78	83	(79)	40	84	77 (75)	78	87	72	71 (86)	78	264						
NDTX8-731-1R	85	89	--	85	84	(85)	65	90	76 (88)	70	90	82	82 (85)	82	294						
NDTX9-1068-11R	82	90	86	92	89	(71)	60	92	63 (74)	83	94	71	68 (76)	79	387						
Red LaSoda	80	90	81	89	81	(84)	59	90	56 (86)	71	87	82	59 (67)	74	383						
Shepody	89	--	--	--	--	(37)	--	--	-- (78)	--	--	54	--	-- (50)	--	--					
Location Means	86	87	79	84	76	(60)	63	81	74 (78)	72	80	69	62 (65)	75	321						

1/ Clovis, NM: U.S. No. 1's, 6 oz and over.

Western Table 4. 1989 U.S. No. 1's over 10/12 oz, percent of total yield for locations; overall mean, percent and cwt/acre; early harvest in parentheses, not included in entry mean.

Entry	Calif		Colo		Idaho		NMex		Oregon		Texas		Wash		Mean % cwt/A
	Krn	Tul	SLV	Ab	Kim	C1v	Frm	1/	Hrm	Klm	Mal	Spr	0th		
A7816-14	5	45	10	34	41	(4)	9	0	36 (16)	38	25	4	32 (16)	28	126
A7961-1	12	41	39	--	--	(--)	30	1	35 (--)	31	16	8	30 (--)	27	107
AC77101-1	12	40	19	32	31	(1)	19	5	35 (32)	33	15	15	45 (40)	28	126
AC7869-17	14	54	42	43	35	(7)	17	0	40 (46)	38	35	26	34 (31)	34	139
AC81198-11	--	54	21	37	41	(3)	25	17	51 (19)	32	23	23	44 (27)	35	171
A081216-1	3	--	17	7	9	(0)	7	6	5 (0)	7	8	4	25 (5)	11	34
A082283-1	15	--	19	24	23	(0)	36	5	49 (17)	13	23	20	28 (21)	27	130
A082611-7	2	--	17	15	22	(2)	19	4	39 (6)	16	14	6	40 (9)	22	103
BC0038-1	8	28	24	17	13	(7)	8	0	38 (28)	12	24	9	25 (22)	20	72
C07918-11	--	41	15	29	27	(4)	20	2	36 (8)	31	30	25	38 (16)	29	116
C08011-5	7	27	22	35	30	(1)	30	6	42 (14)	24	27	11	52 (24)	29	119
TND329-1Ru	9	48	25	30	21	(2)	6	1	31 (25)	40	27	8	45 (25)	28	108
Lemhi Russet	16	39	25	18	37	(0)	12	0	38 (20)	29	22	21	54 (29)	28	131
Russet Burbank	1	19	10	16	10	(0)	8	0	26 (5)	12	7	10	18 (1)	19	67
Norgold Russet	7	--	6	11	13	(2)	1	4	16 (21)	17	12	22	28 (22)	14	48
NDTX8-731-1R	8	32	--	28	32	(21)	17	31	28 (29)	17	22	39	58 (51)	34	109
NDTX9-1068-11R	10	47	34	35	34	(2)	17	41	28 (15)	42	38	17	48 (32)	42	166
Red LaSoda	16	34	17	36	52	(12)	17	24	33 (39)	39	34	34	44 (34)	34	174
Shepody	11	--	--	--	--	(2)	--	--	-- (33)	--	6	--	-- (20)	--	--
Location Means	11	36	21	26	29	(5)	18	10	35 (23)	27	22	16	38 (25)	26	114

1/ U.S. No. 1's over 3".

Western Table 5. 1989 Specific gravity of tubers; early harvest in parentheses, not included in entry means.

Entry	Calif		Colo		Idaho		NMex		Oregon		Texas		Wash		Overall	
	Krn	Tul	SLV	Ab	Kim	C1v	Frm	Hrm	K1m	Mal	Spr	Oth			Mean	
A7816-14	1.079	1.087	1.099	1.085	(65)	1.078	1.081	1.075	(61)	1.082	1.100	1.073	1.077(75)	1.083	abc	
A7961-1	92	88	99	--	--	(--)	75	82	76	(73)	81	97	68	77(--)	84	ab
AC77101-1	88	85	89	78	75	(69)	64	78	68	(63)	75	92	59	74(71)	77	def
AC7869-17	89	71	97	86	80	(66)	69	77	71	(66)	80	86	63	74(71)	79	cde
AC81198-11	--	88	94	85	84	(66)	76	81	79	(68)	83	93	69	76(71)	83	abc
A081216-1	86	--	98	88	88	(64)	73	77	79	(68)	81	96	67	78(77)	83	abc
A082283-1	82	--	104	89	90	(67)	76	79	83	(68)	84	98	70	81(78)	85	a
A082611-7	79	--	96	86	90	(71)	75	81	74	(69)	84	96	79	84(78)	84	ab
BC0038-1	81	89	94	76	78	(72)	67	92	64	(65)	81	87	68	77(76)	80	bcde
C07918-11	--	78	91	76	77	(69)	62	83	68	(61)	77	80	62	71(71)	76	ef
C08011-5	81	67	78	71	72	(62)	58	77	62	(59)	67	75	55	65(65)	69	gh
TND329-1Ru	76	73	80	63	62	(60)	--	78	57	(52)	71	66	61	60(62)	67	hi
Lemhi Russet	85	84	102	93	89	(67)	76	80	80	(71)	85	94	69	80(73)	85	a
Russet Burbank	87	86	98	81	77	(63)	73	74	76	(68)	83	80	71	82(75)	81	abcd
Norgold Russet	84	--	80	75	76	(73)	63	81	61	(69)	73	75	61	69(73)	73	fg
NDTX8-731-1R	74	66	--	68	64	(62)	57	79	49	(58)	62	69	52	59(60)	64	i
NDTX9-1068-11R	79	75	68	68	60	55	74	54	(47)	70	72	59	59(56)	68	hi	
Red LaSoda	83	76	83	77	75	(60)	--	70	57	(59)	70	78	56	63(63)	71	gh
Shepody	90	--	--	--	--	(62)	--	--	--	(63)	--	89	--	--(78)	--	--
Loc. Means	1.083	1.080	1.091	1.080	1.078	(65)	1.068	1.079	1.068	(62)	1.077	1.085	1.065	1.073(70)	1.077	

Western Table 6. 1989 External and internal defects, french fry color, sugar ends, dextrose, vitamin C, protein, and TGA contents

Entry	U.S. No.2 & Culls	No.2 Common Y4 oz %1/ (10 loc)	SCAB ^{2/} bruise (8 loc)	Shatter 3/ (8 loc)	Hollow heart %4/ (4 loc)	Black- spot 5/ (4 loc)	French Color 6/ Color	Sugar Ends %7/ FWB	Dextrose YSI FWB 8/ FWB	Vit.C Mg/100g FWB 8/ FWB	Pro- tein % DWB 8/ DWB 8/	TGA mg/100g DWB 8/
A7816-14	21	4.7	4.4	3	1.8	2.0	3	0.1	17	6.5	6.4	
A7961-1	14	4.9	5.0	4	1.9	1.8	5	--	--	--	--	
AC77101-1	13	4.9	4.3	25	3.2	2.4	4	0.1	25	5.3	0.8	
AC7869-17	23	4.9	4.1	5	2.7	1.8	16	0.1	15	5.3	10.5	
AC81198-11	19	4.9	4.2	10	2.7	3.1	28	0.2	20	4.4	2.0	
AO81216-1	10	4.9	4.4	10	3.6	2.1	2	0.1	25	5.4	3.4	
AO82283-1	15	4.8	3.9	8	4.3	1.2	4	0.1	23	5.7	2.4	
AO82611-7	12	4.9	4.2	1	2.7	1.8	3	0.1	26	6.0	1.3	
BC0038-1	11	4.4	4.0	2	2.9	1.4	1	0.1	16	5.8	7.1	
C07918-11	20	4.4	3.7	17	2.8	1.8	1	0.1	17	5.7	1.9	
C08011-5	12	4.8	3.9	1	2.3	2.1	3	0.1	33	4.2	0.9	
TND329-11Ru	8	4.8	3.9	0	2.3	2.3	3	0.1	25	4.4	2.4	
Lemhi Russet	11	4.9	4.3	10	3.5	1.6	4	0.1	16	4.6	1.5	
Russet Burbank	28	4.9	4.5	4	2.5	1.9	20	0.1	18	5.1	3.1	
Norgold Russet	5	4.8	4.3	6	2.6	2.3	1	0.1	26	6.6	2.0	
NDTX8-731-1R	8	4.5	4.3	6	2.0	2.4	7	0.1	17	6.0	13.6	
NDTX9-1068-11R	12	4.0	3.7	4	2.5	3.2	15	0.2	14	6.1	2.0	
Red LaSoda	19	3.8	4.4	10	2.3	2.3	7	0.1	26	6.1	3.2	
Shepody	20	3.9	4.3	3	--	--	--	--	--	--	--	
Means	15	4.7	4.2	7	2.7	2.1	7	0.1	21	5.5	3.8	

1/ Frm omitted.

2/ 5.0 (none) to 1.0 (most severe); NMex & Colo omitted.

3/ 7 loc, 5.0 (none) to 1.0 (severe); only 3 locations for Shepody.

4/ Mean of 11 locations including Early Harvest, >10/12 oz. tubers.

5/ Mean of 4 locations (SLV, AB, Kim, Hrm), 1.0 (lightest) to 5.0 (darkest).

6/ Mean of 4 locations (SLV, AB, Kim, Hrm), out of 45 F storage, <1.0 (lightest) to 4.0 (darkest).

7/ Mean of 3 locations (Ab, Kim, Hrm).

8/ Aberdeen tubers only, sampled on Oct 19.

Western Table 7. Merit scores, processing and fresh market, and disposition.

Entry	Merit Score: Processing ^{1/}				Merit Score: Fresh Market ^{1/}				Disposition
	Colo SLV		ID 2/	Ore* Hrm	Calif Krn		ID SLV	Ore* HRM	
	Means	Means	Means	Means	Means	Means	Means	Means	
A7816-14	3.0	3.0	3.0	3.0	3.8	3.2	2.0	3.0	2.6
A7961-1	3.0	---	---	3.0	3.2	3.5	---	2.8	RTC ^{3/}
AC7710-1	3.0	1.0	---	2.0	3.2	3.6	4.0	---	RTC
AC7869-17	5.0	3.0	---	4.0	2.9	3.2	4.0	---	CONT
AC81198-11	1.0	2.0	---	1.5	---	3.5	2.0	---	"
A081216-1	3.0	3.0	2.0	3.0	3.3	---	2.0	4.0	DROP
A082283-1	5.0	4.0	1.0	4.5	3.0	---	4.0	3.0	CONT
A082611-7	2.0	5.0	5.0	3.5	3.1	---	1.0	4.0	"
BC0038-1	5.0	3.0	---	4.0	3.8	4.0	4.0	5.0	2.8
C07918-11	3.0	2.0	---	2.5	---	3.4	2.0	---	"
C08011-5	2.0	2.0	---	2.0	3.5	3.2	2.0	3.0	2.7
TND329-1Ru	5.0	1.0	---	3.0	4.2	4.2	5.0	3.0	"
Lemhi Russet	4.0	4.0	4.0	4.0	3.9	3.9	3.0	3.0	CHECK
Russet Burbank	3.0	3.0	1.0	3.0	2.7	3.5	2.0	2.0	"
Norgold Russet	1.0	2.0	---	1.5	3.5	---	1.0	3.0	"
NDTX8-731-1R	---	1.0	---	1.0	3.8	4.0	---	4.0	CONT
NDTX9-1068-11R	2.0	1.0	---	1.5	3.7	4.2	4.0	4.0	RTC
Red LaSoda	5.0	2.0	---	3.5	3.3	3.2	5.0	3.0	CHECK
Shepody	---	---	---	---	3.5	---	---	---	"
Location Means	3.2	2.5	---	2.8	3.4	3.9	2.9	2.9	2.5
									3.0

^{1/}Not included in means.^{2/}1.0 (poorest) to 5.0 (best).^{3/}Composite scores for Ab & Kim

3/ RTC = regional testing completed (3 yrs), CONT = continue in trial, DROP = drop from trial.

CALIFORNIA

R.E. Voss, K.L. Brittan, J. Guerard, H. Carlson, R. Johansen, J. Pavek

Objectives

Obtain or develop new and/or improved russet, white, red, and processing varieties of higher yield and quality:

1. For hot interior valleys, fresh market russet criteria include early maturity, high percentage of count-size tubers, heat tolerance and smog resistance.
2. For northern mountain valleys, fresh market criteria include storageability, high percentage No. 1's, and resistance to leafroll virus/net necrosis.
3. For chip processing, high solids and low sugars.
4. Red-skinned varieties with early maturity, no internal necrosis and shallow eyes are desired in all areas, including those not currently producing reds.
5. Long whites with high percentage No. 1's, good transit and shelf-life qualities.
6. Specialty varieties for new and alternative markets.

Summary

Replicated yield trials were grown in six locations. A total of 38 russets, 26 chippers, 7 long whites and 16 reds were grown in one or more of these locations. This compares with 44, 30, 4 and 9, respectively, in 1988; and 41, 24, 5 and 7, respectively, in 1987. Observational trials of varying size were grown at Tulelake and in Kern and Mendocino counties. Selected for further evaluation from the 5-, 12-, and 27-hill observational trials were 62 russets, 16 chippers, 12 long whites, 30 reds and 2 yellow-flesh. This compares with 61 russets, 48 chippers, 8 long whites, 62 reds and 2 yellows in 1988. In 1987, the respective numbers were 80, 35, 6, 25, and zero. In addition, in 1989, from first-year seedling, single-hill trials at Tulelake and Klamath Experiment Stations, 62 russets, 1 long white and 32 reds were selected. Approximately 25 new specialty selections--yellow-flesh, purple, pinks, etc., were introduced into the seed increase program for evaluation in 1990. Thus, strong emphasis on russets continues, increased emphasis on reds continues, a large number of new chippers was introduced in 1988 that are still being evaluated, a few new long whites are being evaluated annually, and specialty varieties have been added to the program.

The most promising advanced selections or new varieties that have been tested in California with the best results in 1989 include:

<u>Russets</u>	<u>Chippers</u>	<u>Long Whites</u>	<u>Reds</u>
A74212-1	A80559-2	A76147-2	A82745-1R
A81323-6	AC80545-1	A8346-2	A83359-7R
AC77101-1	AD81739-9		A83371-2R
AD83034-5	BR7093-24		A84642-10R
AD83040-6	BC0169-12		AC82706-2R
AD83071-1	CO81103-1		LA12-59-R
COO8014-1	E55-27		MN13035
NDA848-3	NDA2126-6		NDTX9-1068-11R
NDA1411-2	NDD440-9		
ND435-12	NY81		
TND329-1	865D8-2 (Yel)		
Rus. Norkotah			

During 1989, several advanced selections have been named. Some of these have shown potential commercial value in California. The following are newly named varieties that have been tested in California:

<u>Chippers</u>	<u>Russets</u>
BR7093-24	A74114-4
LAO1-38	Frontier Russet
MS700-83	A74212-1
NY72	Century Russet
NY81	
SH1	

The following is a brief description of a few selections and varieties that may have promise in California, based on 1989 and earlier trials:

A81323-6	Long oval, heavy russet. High yielding, very attractive long tubers. Specific gravity equal to or higher than Russet Burbank. Low black spot susceptibility.
A74212-1 (Century Russet)	Long, light russet with high yield potential and good tuber quality. Very light russetting in organic soils or hot interior valleys.
A74114-4 (Frontier Russet)	Long, blocky, medium russet. Medium maturity, comparable to Russet Norkotah, earlier than Russet Burbank and Centennial Russet. Medium to high yield potential; fair storageability.
BR7093-24 (Gemchip)	Oblong oval, white chipper. Good yield potential; specific gravity slightly higher than Kennebec; good chip color. Potentially susceptible to hollow heart and internal necrosis. Maturity similar to Kennebec.
AC80545-1	Round white chipper. Good yield potential; specific gravity somewhat higher than Kennebec; good chip color; large vigorous vine; low oil

	absorption; moderately late maturity; some potential for hollow heart.
A76147-2	Long white. Very high yield potential. Good tuber quality; resistant to hollow heart; some growth cracks. Short dormancy; susceptible to field heat sprouting.
TND329-1	Dark colored, heavy russet, very long tubers. Moderate yields, low tuber number, large tubers. Resistant to black spot and hollow heart.
NDTX9-1068-11R	Round red. Excellent color, shallow eye. Very good yield potential. Resistant to hollow heart and internal necrosis; some growth cracks. Very susceptible to storage rot diseases, thus potential for seed piece decay and poor stands.
LA12-59	Round red. Excellent color. Good yield potential. Resistant to hollow heart and internal necrosis. Shallow eye.
COO8014-1	Oblong blocky, medium heavy russet. Moderate yield potential, high percent No. 1's. Resistant to black spot; some hollow heart and internal necrosis. Medium maturity, medium vine size. Potential for both fresh and processing.

Replicated Yield Trial

Two trial locations were used in Kern County. Yields in the russet trial were lower than usual, averaging 320 cwt/A total yields, with the range of 420 to 210 cwt/A. Highest yielders were Lemhi, NDA848-3, Russet Norkotah, AO82283-1 and A7816-14. Highest tuber quality ratings were for TND329-1, A81323-6, Lemhi and A7961-1. Long white yields ranged from 465 to 250 cwt/A, with an average of 325 cwt/A. Highest yielding were A76147-2, White Rose and MN12567; highest quality were Tejon, A76147-2, BCOO38-1 and MN12567. Red yields ranged from 475 cwt/A to 175 cwt/A, with an average of 300 cwt/A. Highest yielding were Red LaSoda, NDTX9-1068-11R and LA12-59; highest quality were NDTX9-1068-11R and MN12035. Yields of chip varieties were good, averaging 485 cwt/A and ranging from 625 to 370 cwt/A. Highest yielding were Atlantic, CO81103-1, BR7093-24, AC80545-1 and NY81. Highest specific gravity were A80559-2, CO81103-1, COA7919-4, Atlantic, Shepody and E55-35. The Snack Food Association trials were conducted in the same field; highest yielding were AC80545-1, Saginaw Gold and MS716-15. Specific gravity was generally low; chip color was similar among varieties.

At Tulelake, yields and quality were very good. Russet yields averaged 500 cwt/A and ranged from 635 to 300 cwt/A. Highest yielding were AC77101-1, Lemhi, A81323-6, NDA1411-2 and AD83034-5. Highest quality ratings were by TND329-1, AND7430-1, AND77230-1 and AD83071-1. Yields of long whites and chippers averaged 565 cwt/A and ranged from 650 to 345 cwt/A. Highest yielding were AC80545-1, AD81739-9, White Rose and A76147-2. Highest quality ratings were BC0038-1, AC80545-1, LA01-38 and NDD440-9. Highest specific gravity were A80559-2, BCOO38-1 and BR7093-24. Red varieties averaged 475 cwt/A and ranged from 645 to 300 cwt/A. Highest

yielding were A82745-1, A83359-7, AC82706-2 and Red LaSoda. Highest quality were NDTX9-1068-11R, MN 13035 and NDTX8-731-1R. In a separate, larger trial at Tulelake, the yields averaged 550 cwt/A and ranged from 735 to 420 cwt/A. Highest yielding were Red Pontiac, Kennebec, Red LaSoda, A7411-2 and Sierra. Highest quality included Sierra, Krantz, NDD837-2, Dark Red Norland and Gemchip.

Smaller trials were conducted in Riverside County, Santa Maria, Humboldt County, Shasta-Lassen County, and Mendocino. In Riverside County, top performers included Tejon, NDD840-1, Sierra and New Red Norland. At Santa Maria, Sierra was a top performer. In Humboldt County, Kennebec continues to be a top performer; AC80545-1 was the best of the rest. In Shasta-Lassen, COO8014-1 and CO8011-5 performed well.

Table 1
CALIFORNIA
Summary of No. 1 Yields, Tuber Quality and Storageability
Of Standard and Potential Varieties

Variety	Kern County	Tulelake Field Station	Riverside County	Santa Maria	Humboldt County	Adj. Dev. From Mean	Spec. Grav.	Tuber Rating	Storage Notes
A. RUSSETS									
A7411-2		476		400		5	75	3.8	Fair
A74212-1 (Century)		483*				10			Good Dis. Res., ShBr, Fair Dis. Res., Mod BS
A74114-4 (Frontier)		409				-62			Poor Dis. Res., Med. Mat.
A74133-1				410		-8		3.7	
A7816-14	321	417				-38	90	3.4	Short Dorm., GC
A7961-1	292	493				36	83	3.5	Fair
A80445-6		470				25	85	2.9	Good BS, HH
A81323-6		288		558		66	88	4.0	Good
AC77101-1	277	594				78	86	3.3	Fair HH, GC, IN
AC7869-17	240	297				-88	80	3.1	Good HH, IN, ShBr
AC80369-1	263					-6	87	3.1	GC
AC81198-11		437				-8	88	3.5	Poor HH
AD7267-3		326				-145			Good Dis. Res., ML Mat.
AD7818-5		365				-106			Fair Dis. Res., Med. Mat.
AD81512-2	204					-65	75	3.3	HH, KN
AD83034-5		510				65	78	3.9	Exc HH
AD83040-6		473				28	81	3.7	Poor HH
AD83052-3	137					-132	86	2.9	HH, IN, KN
AD83071-1		492				47	80	4.0	Fair
AND7430-1		405				-40	78	4.1	Good
AND77230-1		260				-185	73	4.1	Exc
A081216-1		232				-37	86	3.3	
A082283-1		322				53	82	3.0	GC, RH, Yel. Flesh
A082611-7		261				-8	79	3.1	GC, IN
C07918-11		405				-40	79	3.4	Good HH, BS
C08011-5	257	461				2	74	3.3	Poor IN, GC
C081103-1		451				6	85	3.6	Poor
C08182-1		376				-69	73	3.8	Poor
C08190-1		331				-114	86	3.7	ShBr, BS
C008014-1	287	455		304		-5	86	3.5	Poor ShBr, Short Dorm., IN, Fair Dis. Res., ME Mat.

Variety	Kern County	Tulelake Field Station	Riverside County	Santa Maria County	Humboldt County	Adj. Dev. From Mean	Spec. Grav.	Tuber Rating	Tuber Storage Notes
A. RUSSETS, continued									
MN10874		428		320 590		-58	79	3.6	Fair Short Dorm., BS
ND435-12	289				96	77	3.2		RH
NDA848-3	346				77	84	3.4		GC
NDA1411-2	248	512			23	84	3.4	Poor Short Dorm., BS, Exc. Dis. Res., Med. Mat.	
NDD837-2		520			75	78	3.1	Exc Good Dis. Res., ML Mat.	
NDD840-1		414*	426		5	76	4.2	Fair	
TND329-1	241	355	349		-54	87	3.0	GC, KN	
UC87-3	215				-47			Poor Dis. Res., Med. Mat.	
Hillite		424			-69			Fair Dis. Res., ML Mat.	
Krantz		540							
Lemhi	398	559			122	84	3.8	Fair	ShBr
Norgold Russet	266				-3	84	3.5		
Russet Burbank	193	458		290	-35	87	3.2	Exc	KN, IN
Russet Norkotah	337	442		535	52	80	3.7	Poor Dis. Res., Early	
Sierra		462*	418	460	259	21	73	2.7	Poor Fair Dis. Res., Med. Mat., Missshapen
Cal Ore		394				-77			
Calgold		269	442	350	195	-38	93	2.8	Fair Dis. Res., Med. Mat.
				369	418	252			Fair Dis. Res., Med. Mat., KN, Missshapen
B. LONG WHITES									
A76147-2		408	584			92	82	3.8	Poor Short Dorm., GC
B47	217				-50	93	3.5		IN, BS
BC0038-1	242	443	289		-61	85	4.0	Fair	
MN12567	283				16	91	3.8		GC
Tejon	255		446		44	86	4.1	Good	GC, KN
White Rose	287	599	307		12	80	2.6	Fair	GC, KN
White Rose 50	177				-90	85	2.3		GC, KN
	Mean	267	542	347					
C. REDS									
A79543-2	212		347	370		-14	77	3.0	GC, IN
A79543-4	176				-79	86	3.7		SM
A82283-2	221				-34	78	3.4		SM
A82745-1		586			156	72	3.9	Poor	Good Color
A83359-5		395			-35	67	3.8	Good	Good Color

Variety	Kern County	Tulelake Field Station	Riverside County	Santa Maria	Humboldt County	Adj. Dev. From Mean	Spec. Grav.	Tuber Rating	Tuber Storage Notes
C. REDS, continued									
A83359-7		571			141	72	3.6	Fair	Good Color
AC82706-2	259	543			58	78	3.5	Fair	GC, IN, Good Color
AD82583-1	221		394		-34	84	3.4	IN	
AD82706-2			381		-36	71	3.9	Good	Good Color
LA12-59	341				18	86	3.8	Fair	Exc. Color
MN12035	257	380			-24	80	3.8	Poor	HH, IN, Good Color
MN13035		396			-6	78	3.4	Poor	Exc. Color, RH
NDTX8-731-1	235	267			-92	72	3.9	Good	IN, Exc. Color
NDTX9-1068-11	357	445	302		210	3	78	4.0	V. Poor
UC142-1	143	275			-134	72	3.8	V. Poor	Exc. Color, GC
New Nonland		480	408		229	9	85	3.0	GC, RH, V. Poor Dis. Res., V. Early
Red La Soda	378	554*	360		340	82	82	2.8	Fair HH, Fair Dis. Res., Med. Mat., IN, GC, ShBr
Red Pontiac		686				215			Fair Dis. Res., Late, RH
Mean	255	460	352	365	267				
D. CHIPPERS									
A80559-2	398	536			-4	98	3.8	Poor	HH, BS
AC80545-1	490*	623			336	78	4.1	Poor	HH, IN
AD77187-7	344				317	-34	3.6	Fair	Short Dorm., IN
AD80481-5	459				300	14	82	3.3	IN
AD81739-9		606			105	88	4.0	V. Poor	HH
AF875-16	311	499	275		-45	85			
CD80132-1					-1	88	3.6	Poor	
C081103-1	512				71	97	4.0		
COA7919-4	313	487			243	-63	93	3.7	HH, IN
E55-27	437				-4	86	3.5	Good	ShBr, GC, HH, RH
E55-35		398			-43	90	3.8		
E57-13	397				-44	79	3.5		
MS700-70	331				-25	78			
MS716-15	421				65				
MS700-83	410				-10	85			
NDA2031-2	407				-34	86	2.8		
NDA2126-6	482				41	84	3.5		
NDD44-0-9					51	81	4.0	V. Poor	
NDD2007-1					-34	93	3.9		
NDD2563-7	510				9	76	3.8	SM	

Variety	Kern County	Tulelake Field Station	Riverside County	Santa Maria	Humboldt County	Adj. Dev. From Mean	Spec. Grav.	Tuber Rating	Tuber Storage Notes
D. CHIPPERS, continued									
NDO1496-1	415					-26	87	3.5	
NY85 (D195-24)	232					-124	79		
TXA68-1					167	-111	91	3.8	
Alleghany (NY72)	395					39	79		
Atlantic	476*					92	86	4.5	HN, HH, IN
Gemchip	508	477*				25	88	3.6	Fair Good Dis. Res., ML Mat., HH
Kanona (NY71)	479					38	73	4.0	HH
Kennebec	450*	486				404	37	3.6	Fair Exc. Dis. Res., GN, Late, HH, IN
La Belle (LA01-38)	225	306				-163	78	4.0	Poor BS
Norchip	321					-35	82	3.3	HH, IN
Saginaw Gold	464					108	74		
Shepody	420	505				6	90	3.5	Fair Dis. Res., Late
Snowden	360					4	80		
Somerset	325					-31	78		HH
Spartan Pearl (MS70	412					56	66		IN
Steuben (NY81)	495	431				216 275	-19	3.6	Poor ShBr, HH, IN, RH, GH
Mean	420	501				278			

Table 2
CALIFORNIA
Selections From Non-Replicated Observational Plots

CLONE	LOCATION	CLONE	LOCATION
<u>RUSSETS</u>			
A74114-4	T-27	C08118-2	K-27, T-27
A81727-6	K-5	C08195-4	K-27
A81779-2	K-5	C082142-4	K-27, T-27
A83234-8	T-12	C08354-4	T-5
A84458-9	T-12	C083120-3	K-5
A84496-5	T-27		
A84712-1	T-12	COA8456-5	T-12
		COA8544-1	T-12
AC80369-1	T-27		
AC81240-2	T-5	MN10874	K-27
AC82263-1	T-27		
AC82693-4	T-27	ND435-12	K-12, T-27
AC83044-1	K-5, T-5	ND1538-1	T-27
AC83044-2	K-5		
AC83064-6	K-5, T-5	NDA848-3	T-27
AC83172-1	K-5	NDA2821-1	T-27
AD8053-1	T-5	NDD800-3	T-27
AD8053-4	T-5	NDD1099-3	T-27
AD80190-5	T-5	NDD1965-3	K-27
AD80203-1	T-5		
AD80203-2	T-5	WD641-10	K-27
AD81872-7	K-12		
AD81873-4	K-12		
AD82158-2	K-12	<u>CHIPPERS</u>	
AD82162-1	T-12		
AD82162-3	K-12, T-12	86SD8-2	T-27
AD82162-4	K-12		
AD8311-5	T-5	A84369-1	T-12
AD8338-1	T-5		
AD89344-1	T-5	AD80190-3	T-5
AD8344-2	T-5	AD84545-1	T-12
AD83124-1	T-5		
AD83145-2	T-5	BC0169-12	T-27
AD83146-1	T-5		
AD83206-1	T-5	C08327-3	T-5
AD83213-1	T-5		
AD83218-1	T-5	MN12823	T-27
AD83221-2	T-5		
AD83222-1	T-5	MS700-83	T-27
AD83224-1	T-5		
AD83224-2	T-5	ND2008-2	T-27
AD83258-1	T-5		
AD83277-1	T-5	ND2050-1	T-12
AD83277-2	T-5		
AD84376-1	K-12, T-12	NDA2882-1	T-27
AD84418-3	K-12		
AD85103-1	T-12	NDD2007-1	K-27
AD85345-5	K-12		
AD85352-2	K-12, T-12	Alleghany	T-27
AD85356-2	K-12	Norchip	T-27
AD85367-4	K-12	Rosa	K-27
AD85369-2	K-12		
AD8644-2	T-5		
AD86107-1	T-5		

<u>CLONE</u>	<u>LOCATION</u>	<u>CLONE</u>	<u>LOCATION</u>
<u>REDS</u>		<u>LONG WHITES</u>	
A82583-2	K-27	A79179-1	T-12
A82705-1	K-12, T-27	A8346-2	T-27
A8333-1	T-5	A8499-27	T-27
A83371-1	K-12		
A83371-2	T-27		
A84642-10	K-12, T-27	AD74548-5	T-27
A84650-3	K-12, T-5	AD83282-5	K-12
A84651-2	T-27	AD8487-1	K-12
A84662-1	K-12, T-27	CO8327-3	K-5
A84665-4	T-27		
A84666-4	K-12, T-12, T-27	ND2050-1	T-12
AD81560-4	T-27		
AD82583-1	T-27		
COA82177-1	T-27		
MN13035	K-27		
ND1562-4	T-27		
NDA3003-1	K-27, T-12, T-27		

COLORADO

D. G. Holm

Breeding Program

Thirty parental clones were intercrossed in 1989. Seeds from 122 combinations were obtained. Sixty seedling families were grown in the greenhouse, producing 14,044 tubers for initial selection in 1990. Surplus tubers will be distributed to Idaho, Oregon, Texas, and Alberta, Canada.

Seedling tubers were obtained from Dr. J. J. Pavek, Aberdeen, Idaho; Dr. J. Creighton Miller, Lubbock, Texas; and Dr. Kathleen Haynes, Beltsville, Maryland.

Selection Program

A total of 71,215 first-year seedlings were planted, with 781 being selected for further observation. Another 578 clones were in various stages of preliminary and intermediate testing. One hundred seventy-nine of these clones were saved for further evaluation. Twenty-one advanced selections (18 russets, 2 chippers, and 1 long white) were saved and will be increased. Another 119 clones were maintained for breeding and other experimental purposes.

Advanced Yield Trial. Twenty-six clones, 22 advanced selections and four cultivars, were evaluated in the advanced yield trial. Results on yield, grade, and other characteristics are summarized in Table 1. Data on grade defects are presented in Table 2.

Clone C082142-1 will be entered in the 1990 Western Regional Trials. Selections with processing potential are AC75430-1, AC80369-1, AC83044-1, AC83064-6, AC83172-1, BC0224-3, C081095-4, C083027-2, C083029-3, and C083120-3.

Chipping Studies. Thirty clones, 27 selections and 3 cultivars, were tested for chipping potential at harvest and after various storage regimes. This information is presented in Table 3.

Overall chip color was very good in 1989. None of the clones produced acceptable chips after 10 weeks of 40° F storage. However, after reconditioning, several of these clones did produce acceptable chips. Thirteen selections had color ratings better than Norchip (<2.0) after 10 weeks of 50° F storage and three weeks of 60° F reconditioning.

Selection AC83306-1 will be formally entered in the Western Regional Chipping Trials in 1990.

Results of chipping tests by Borden, Inc. are given in Table 4. Ten selections had color ratings better than Norchip.

Western Regional Trials. Advanced selections from the Colorado program entered in the Western Regional Trials were AC77101-1, AC78069-17, AC80545-1, AC81198-11, BC0038-1, C079018-11, and C08011-5. BC0038-1 is a long white with processing potential. AC80545-1 is a round white chipping selection. Russets with fresh market potential are AC77101-1, AC81198-11, and C08011-5. AC78069-17 and C079018-11 are dual purpose russets with fresh market and processing qualities.

Results of these trials are presented in the Western Regional Potato Variety Trial report elsewhere in this publication.

Grower Trials. Grower evaluations were conducted on AC77101-1, C08011-5, AC80545-1, and BC0038-1. Grower tests and seed increase will continue on all of these selections in 1990.

Potential Cultivar Release. AC80545-1 has undergone extensive testing and will probably be named in early 1991 pending additional processing tests by commercial chippers.

Colorado Table 1. Yield, grade, stand, vine maturity, specific gravity, stem number per plant and tuber shape and skin type for advanced yield trial clones - 1989.

Clone	Yield (Cwt/A)				% Stand	Vine Maturity ¹	Specific Gravity	Stems/Plant	Tuber Shape & Skin Type ²					
	US #1		< 4 oz											
	Total	%	> 10 oz	< 4 oz										
AC75430-1	399	340	85.0	89	47	99	3.0	1.101	3.7					
AC80369-1	391	292	75.0	44	68	100	3.2	1.099	5.7					
AC81240-2	357	244	68.2	29	97	99	2.0	1.084	6.7					
AC82263-1	337	244	72.5	36	70	98	3.0	1.093	4.3					
AC83044-1	363	302	82.8	58	35	97	3.0	1.092	2.6					
AC83044-2	355	252	71.2	39	97	99	2.5	1.086	5.4					
AC83064-1	441	370	83.9	82	68	99	3.0	1.087	4.9					
AC83064-6	343	283	82.5	49	59	94	2.8	1.086	3.7					
AC83068-1	491	401	81.4	72	79	99	3.2	1.088	5.4					
AC83172-1	371	288	77.4	33	81	98	3.0	1.106	4.4					
BC0224-3	350	228	65.2	23	118	95	3.0	1.097	3.3					
C081018-2	329	226	68.6	51	96	98	3.8	1.092	7.0					
C081038-6	276	178	64.3	28	93	87	2.0	1.087	6.8					
C081082-1	352	284	80.5	34	66	98	2.0	1.078	4.4					
C081095-4	312	213	68.3	21	98	100	3.2	1.102	6.6					
C082142-4	402	360	89.4	94	40	98	4.0	1.093	4.1					
C083027-2	389	326	83.6	46	56	99	3.0	1.094	5.5					
C083027-3	412	333	81.2	78	52	99	3.0	1.082	4.4					
C083029-2	350	273	78.2	50	66	98	3.2	1.091	4.0					
C083054-4	337	244	72.2	32	80	97	2.2	1.095	2.8					
C083120-3	356	280	78.2	54	72	98	3.0	1.089	4.9					
MN10874	377	287	76.2	34	87	98	3.0	1.086	5.2					
Norgold Russet	351	249	70.7	16	100	98	1.5	1.078	5.1					
Centennial Russet	319	257	80.5	32	62	97	3.0	1.087	3.0					
Russet Burbank	401	290	72.5	64	87	99	3.5	1.085	3.3					
Russet Nugget	384	323	84.1	70	60	98	4.0	1.097	3.7					
Mean	367	283	76.7	48	74	98	2.9	1.091	4.6					
LSD ³ (0.05)	46	47	6.8	28	22	4	0.5	---	1.1					

¹ Vine maturity is rated on the following basis: 1=very early; 2=early; 3=medium; 4=late; and 5=very late.

² Tuber shape: Ob=Oblong; L=Long. Skin Type: R=russet; W=white.

³ Least significant difference.

Colorado Table 2. Grade Defects for advanced yield trial clones - 1989.

Clone	% External Defects ¹	External Defects Observed ²	% Hollow Heart ³
AC75430-1	3.0	SG*, GC, MS*	2.5
AC80369-1	7.7	SG, GC*, MS	0.0
AC81240-2	4.7	SG, GC*, MS*	1.9
AC82263-1	6.9	SG, GC, MS*	0.0
AC83044-1	7.2	SG, GC*, MS	0.0
AC83044-2	1.5	SG, MS*	0.0
AC83064-1	0.6	GC, MS*	0.0
AC83064-6	0.3	MS*	0.0
AC83068-1	2.2	GC*, GR	0.2
AC83172-1	0.4	MS*	0.0
BC0224-3	1.2	SG, MS*	0.7
C081018-2	2.2	GC*, MS	0.8
C081038-6	1.9	GC*, MS, GR	0.0
C081082-1	0.6	MS*	1.0
C081095-4	0.3	GC*	1.8
C082142-4	0.7	GC*, MS*	1.0
C083027-2	1.7	GC*, MS	0.4
C083027-3	6.4	GC*, MS, GR	0.6
C083029-2	3.2	GC*, MS*, GR	1.3
C083054-4	4.0	GC*, MS	0.0
C083120-3	1.0	GC*	0.0
MN10874	0.6	MS*	0.0
Norgold Russet	0.4	MS*	1.6
Centennial Russet	0.2	GC*	1.0
Russet Burbank	6.0	SG*, GC, MS	0.5
Russet Nugget	0.4	GC, MS*	1.2

¹Percent external defects based on the proportion of the total sample weight with significant defects.

²SG=second growth; GC=growth crack; MS=misshapen; GR=green. Most prevalent defects for each clone are asterisked.

³Percent hollow heart calculated as follows: (Weight of tubers >10 ounces with defect/total sample weight) x 100.

Colorado Table 3. Chip color¹ and specific gravity of San Luis Valley chipping study entries - 1989.

Clone	At Harvest	3 wks 70° F	10 wks 40° F	10 wks 50° F	10 wks/40°F +3 wks/60°F	10 wks/50°F +3 wks/60°F	Specific Gravity
A80559-2	2.5	3.0	4.0	2.0	2.0	1.5	1.131
AC80545-1	1.0	2.5	5.0	2.5	4.0	1.0	1.102
AC83282-2	3.5	3.0	3.5	3.0	2.0	1.5	1.112
AC83306-1	2.5	2.5	4.0	2.5	2.0	1.5	1.114
AC83311-1	3.0	3.5	4.5	3.0	3.5	2.0	1.105
AC83311-2	3.0	3.0	4.5	3.5	3.0	1.5	1.105
AC83311-5	1.5	3.0	4.5	2.0	3.0	1.5	1.080
AC83368-3	2.0	3.0	5.0	2.5	4.0	2.0	1.086
AC84545-2	4.0	3.5	4.0	2.5	4.0	1.5	1.093
AC84545-5	2.0	2.0	3.5	2.5	2.5	2.0	1.103
AC84552-2	1.0	1.0	5.0	2.0	4.5	2.0	1.083
AC84552-3	2.0	1.5	4.5	2.5	3.0	2.0	1.111
AC84601-1	2.5	2.5	3.5	2.0	2.0	1.5	1.088
AC84610-2	2.5	1.5	4.5	2.0	3.0	2.0	1.082
AC84610-5	3.0	1.5	5.0	1.5	2.0	1.5	1.100
AC85403-5	2.0	2.0	4.0	1.5	3.0	2.0	1.096
AC85403-12	4.0	4.0	5.0	4.0	4.5	2.5	1.079
AC85438-4	1.0	1.0	3.0	1.0	2.0	1.5	1.094
AC85438-5	4.0	2.5	5.0	2.5	3.0	2.5	1.094
AC85439-3	4.0	4.0	4.5	4.0	4.0	3.0	1.092
AC85461-1	2.5	1.0	5.0	2.5	3.5	2.0	1.078
AC85461-4	1.5	1.0	4.0	1.0	3.0	1.5	1.087
AC85548-1	3.5	1.5	5.0	2.5	4.5	2.5	1.079
AV77531-1	4.0	3.5	4.5	3.0	3.0	2.0	1.090
ND2008-2	1.5	1.5	4.0	1.0	2.5	1.5	1.088
ND2109-7	1.5	1.5	5.0	1.5	3.0	1.5	1.092
ND651-9	3.5	3.0	4.5	3.5	3.0	2.0	1.093
Atlantic	2.5	2.5	5.0	2.0	2.0	1.5	1.111
Gemchip	1.0	2.5	5.0	2.0	4.0	2.0	1.088
Norchip	2.0	1.0	4.0	2.0	3.0	2.0	1.088

¹Chip color was rated using the Potato Chip/Snack Food Association 1-5 scale.
Ratings of 2.5 or less are acceptable.

Colorado Table 4. Chipping evaluations by Borden, Inc.¹ - 1989.

Clone	Specific Gravity	Color ^{2,3} Jan. 19
A80559-2	1.104	1.0
AC80545-1	1.082	2.5
AC83282-2	1.089	3.5
AC83306-1	1.087	2.5
AC83311-1	1.096	1.5
AC83311-2	1.101	1.5
AC83311-5	1.077	1.0
AC83368-3	1.084	3.5
AC84545-2	1.093	6.0
AC84545-5	1.098	1.5
AC84552-2	1.081	2.0
AC84552-3	1.104	2.0
AC84601-1	1.082	2.5
AC84610-2	1.080	3.0
AC84610-5	1.095	2.0
AC85403-5	1.084	2.0
AC85403-12	1.082	7.0
AC85438-4	1.100	4.0
AC85438-5	1.093	5.0
AC85439-3	1.085	6.0
AC85461-1	1.076	3.5
AC85461-4	1.082	1.0
AC85548-1	1.077	3.0
AV77531-1	1.084	4.0
Atlantic	1.098	1.5
Gemchip	1.083	2.5
Norchip	1.079	2.5

¹Data collected by Mr. Larry Anderson.

²Color was rated using the PCII 1-10 scale.
Ratings of 1-4 acceptable, 5 marginal.

³Potatoes were harvested September 1-5 and held at approximately 55-60° F prior to shipping September 29. Gradually cooled to 48-52° F by December 1.

FLORIDA

J. R. Shumaker, D. P. Weingartner, and Steve Molnar

Variety and Seedling Trials

Methods. Potato varieties and seedlings were tested for their adaptability and desirable horticultural characteristics at the Agricultural Research and Education Center, Hastings, Florida. Clones were grown in advanced trials (four replications) or intermediate trials (two replications). Temik® (3 lb ai/A in-the-row at planting) was applied to all trials. Seed was spaced 12 inches apart in 20 foot single row plots. Between row spacing was 40 inches. The crop was planted on February 2 and 3 and harvested May 22-23. Commercial cultural practices were used in all tests. Yield of tubers, their appearance and specific gravity were taken at harvest. Tuber samples were shipped to Berwick, Pennsylvania, for chip color evaluations. The tests were grown under favorable conditions.

Round White and Red Skin Adaptability and Processing Quality Trials. Atlantic (standard chip processing variety), B9792-8B, AF828-5, NY 81, B0233-1, and Denali produced the best tuber yields and processing traits (Table 1). Only Denali produced specific gravity values equal to or greater than Atlantic.

Long Russet Adaptability Trials. Several clones produced tuber yields equal to or greater than NemaRus (standard long russet variety) (Tables 3 and 4). However, all were considered inferior when compared to the size and shape of the tubers produced by NemaRus.

Florida, Table 1. Results from several clones selected for advanced testing at Hastings, Florida -- 1989.

Clone	Yield (cwt/A)			Under			Specific gravity	Ratings Appearance2/ Rots3/	Chip Color1/ Days after harvest		
	US 1A (Over 1 7/8")	outs (Size A)	1 7/8" (Size B)	Grand total	1 7/8"	9 16 23			9	16	23
B9792-8B	270	23	5	298	1.077	7.5	0.3	0.3	3	3	5
AF 828-5	256	23	5	284	1.071	7.8	0	0	2	2	3
NY-81	247	43	5	295	1.074	7.8	0.5	0.5	2	4	4
Atlantic	244	13	5	261	1.081	7.3	0.3	0.3	2	2	2
B0233-1	235	15	6	256	1.070	6.8	0.5	0.5	3	2	3
Denali	225	29	9	262	1.082	7.0	0.8	0.8	2	5	4
B0243-7	207	26	6	239	1.070	5.3	0.5	0.5	1	2	4
B9792-158	205	21	6	233	1.068	7.3	0.5	0.5	2	3	5
B0178-14	204	15	10	229	1.082	8.0	0	0	2	3	4
NY-72	199	15	5	219	1.078	6.8	0.3	0.3	1	3	2
B0172-15	198	32	6	236	1.069	7.0	0.3	0.3	3	3	4
BN 9805-2	195	38	10	244	1.064	5.8	0.8	0.8	5	6	8
BN 9826-1	193	65	7	264	1.067	7.0	0.5	0.5	6	8	8
B0180-36	192	19	12	223	1.078	5.5	0.5	0.5	3	4	5
AF 1060-2	192	17	6	214	1.072	7.5	0	0	3	4	4
B0209-1	187	29	1	217	1.071	7.0	0.3	0.3	1	4	4
B0178-34	184	16	9	208	1.078	4.8	0.5	0.5	2	2	2
CS 7635-4	183	33	9	224	1.069	6.3	0.8	0.8	5	2	2
Red La Soda	183	27	7	217	1.064	5.0	1.0	1.0	-	-	-
Sebago	181	21	9	211	1.065	6.8	0.3	0.3	3	2	3
E55-35	180	11	14	205	1.080	7.0	0.5	0.5	2	2	3
B0234-4	170	13	8	191	1.075	6.3	0.5	0.5	3	3	3
E40-10	169	10	6	185	1.062	8.0	0.8	0.8	1	3	3
B0240-11	169	23	10	202	1.074	6.3	0.5	0.5	2	4	4
Norchip	169	14	11	193	1.076	5.8	1.0	1.0	5	5	5

Florida Table 1, continued

Clone	Yield (cwt/A)						Chip Color ^{1/}			Days after harvest		
	US 1A (Over 1 7/8")		outs (Size A)		1 7/8" (Size B)		Grand total	Specific gravity	Appearance ^{2/}	Ratings	Rots ^{3/}	
	pick	outs	1 7/8"	(Size B)	total	gravity			9	16	23	
E40-10	169	10	6	185	1.062	8.0	0.8	1	3	3	4	
B0240-11	169	23	10	202	1.074	6.3	0.5	2	4	4	5	
Norchip	169	14	11	193	1.076	5.8	1.0	5	5	5	5	
AF236-1 (Somerset)	165	12	4	181	1.077	8.0	0	1	2	2	2	
LA 12-59	165	14	14	193	1.071	7.0	0.8	2	5	5	5	
NEA 219-70-3	160	12	7	179	1.070	6.3	0.3	2	3	3	3	
E55-27	160	8	8	175	1.081	7.0	0	1	2	2	2	
Ontario	159	13	9	181	1.072	5.8	0	-	-	-	-	
B0238-4	156	15	8	179	1.078	5.8	0.5	1	2	3	3	
B0237-1	155	12	21	189	1.072	6.8	0.3	1	2	3	3	
B0255-9	154	11	10	174	1.085	7.0	0	1	1	2	2	
E57-13	148	13	10	172	1.074	7.3	0.3	2	3	4	4	
Superior	145	21	8	174	1.077	6.3	1.0	4	2	3	3	
B0238-31	145	14	8	166	1.074	5.8	0.5	-	-	-	-	
E11-45	144	11	16	170	1.059	6.3	0.5	3	2	2	2	
B0234-8	142	12	6	160	1.077	7.8	0.8	4	2	4	4	
B0234-7	137	13	10	160	1.072	4.3	0.3	2	2	3	3	
AF875-16	129	12	11	152	1.081	5.8	0.8	2	3	3	3	
D164-9	127	16	18	161	1.077	6.8	0.5	1	3	1	1	
Red La Rouge	122	13	9	144	1.065	4.8	1.0	-	-	-	-	
NY 85 (D195-25)	112	15	14	141	1.081	6.3	0.5	2	-	-	-	
E55-44	104	8	11	123	1.072	6.5	0.5	1	1	2	2	
LSD (.05)	41.1	3.3	4.4	44.2	0.003	1.1	-	-	-	-	-	

1/ Chip Color: 1-4 = acceptable; 5 = borderline; 6-9 = too dark for use.

2/ From 10.0 = most desirable to 0.0 = completely undesirable.

3/ Rot rating: 0 = none to 5 = 100% rot.

Florida, Table 2. Results from several clones selected for intermediate testing at Hastings, Florida -- 1989.

Clone	Yield (cwt/A)				Ratings				Chip Color/ Days after harvest		
	US 1A (Over 1 7/8")		Outs (Size A) (Size B)		Grand total	Specific gravity	Appearance2/ Rots3/		9	15	23
	Pick	Under	1 7/8"	Size B)							
B0179-17	209	17	7	234	1.069	7.0	0.5	0.5	3	2	3
B0642-6	178	33	21	231	1.066	8.0	0.5	-	-	-	-
B0566-5	178	15	17	210	1.075	6.5	0	-	-	-	-
B0608-6	175	17	10	202	1.071	7.5	0	-	-	-	-
Atlantic	172	23	7	202	1.080	7.5	0.5	1	1	1	1
B0595-4	165	36	13	214	1.067	7.0	1.0	-	-	-	-
B0608-3	163	21	16	200	1.069	7.0	0	-	-	-	-
B0616-1	159	23	10	193	1.072	7.5	0.5	-	-	-	-
B0610-6	159	16	9	183	1.075	7.5	0	3	5	4	4
B0615-1	154	52	7	211	1.067	6.5	0.5	-	-	-	-
AF 1161-1	146	18	16	180	1.074	6.0	0.5	2	3	3	3
B0615-2	145	16	26	188	1.066	7.5	0	-	-	-	-
B0564-5	145	6	11	162	1.069	7.0	0	-	-	-	-
B0179-6	145	14	16	174	1.085	6.5	0	-	-	-	-
B0601-1	143	16	9	168	1.077	7.5	0	-	-	-	-
B0174-19	143	10	8	161	1.083	6.0	0	2	2	2	2
B0608-7	138	16	33	187	1.073	7.0	0	-	-	-	-
Sebago	138	19	9	165	1.064	7.5	0	1	2	4	4
B0440-27	137	13	35	185	1.075	6.0	1.0	-	-	-	-
B0177-20	136	7	18	161	1.084	6.5	0	-	-	-	-
B0179-19	124	8	13	146	1.082	6.0	0.5	-	-	-	-
B0595-1	123	36	9	167	1.062	8.0	0.5	2	3	4	4

Florida Table 2, continued

Clone	Yield (cwt/A)						Chip Color ^{1/}					
	US 1A (Over 1 7/8")			Pick outs (Size A)			Under 1 7/8" (Size B)		Grand total	Specific gravity	Appearance ^{2/}	
	10	162	1.073	7.5	0.5	-	9	15			23	
B0554-2	122	21	19	151	1.077	7.0	0.5	-	-	-	-	-
AF 875-17	120	21	10	140	1.081	7.0	1.0	-	-	-	-	-
B0175-20	117	16	7	136	1.073	6.0	0	1	1	2	-	-
B0347-4	116	16	6	149	1.073	7.5	0	-	-	-	-	-
B0622-2	113	19	16	152	1.085	6.0	1.0	2	2	3	-	-
B0179-3	111	26	15	131	1.079	7.5	1.0	1	2	3	-	-
Superior	107	10	14	131	1.083	7.5	0	3	3	3	-	-
B0175-2	107	18	7	116	1.077	8.5	0	-	-	-	-	-
B0554-1	101	6	10	124	1.091	5.5	0.5	1	3	2	-	-
B0178-41	97	19	10	119	1.077	7.0	1	2	2	-	-	-
B0172-22	96	12	12	131	1.074	6.0	1.0	-	-	-	-	-
B0329-10	94	13	25	121	1.072	6.5	0	-	-	-	-	-
B0179-1	90	22	10	109	1.077	8.0	0.5	4	3	3	-	-
B0591-8	82	18	10	99	1.083	6.0	0	-	-	-	-	-
B0178-39	79	10	11	109	1.074	6.0	0.5	-	-	-	-	-
AF 1094-19	72	9	28	108	1.065	5.5	0.5	-	-	-	-	-
B0468-20	65	11	33	108	-	-	-	-	-	-	-	-
LSD (.05)	40.7	18.5	6.7	39.8	0.003	NS	-	-	-	-	-	-

^{1/} Chip Color: 1-4 = acceptable; 5 = borderline; 6-9 = too dark for use.^{2/} From 10.0 = most desirable to 0.0 = completely undesirable.^{3/} Rot rating: 0 = none to 5 = 100% rot.

Florida, Table 3. Results from several russet-skin clones selected for advanced testing at Hastings, Florida -- 1989.

Clone	Yield (cwt/A)			Grand total	Specific gravity	Ratings
	US 1A (Over 1 7/8")	(Size A)	Under 1 7/8" (Size B)			
B0190-2	220	43	23	286	1.065	6.0
B0184-30	198	30	8	236	1.072	6.5
B0306-6	191	20	14	225	1.069	5.5
B0180-18	175	13	12	200	1.063	6.3
B0186-1	167	18	6	192	1.072	7.3
B0184-18	165	29	11	205	1.066	6.3
Nema Rus	163	23	11	196	1.063	8.0
Coastal Russet	161	20	20	200	1.064	6.8
B0184-16	158	32	13	204	1.071	6.0
B0190-9	156	38	9	203	1.067	6.3
B0180-39	151	16	13	179	1.060	5.8
B0316-19	131	51	10	191	1.069	5.3
B0330-39	117	23	21	161	1.068	6.5
B0186-23	110	39	15	165	1.078	5.3
LSD	59.2	21.9	6.7	59.8	0.005	1.4
						-

1/ From 10.0 = most desirable to 0.0 = completely undesirable.

2/ Rot rating: 0 = none to 5 = 100% rot.

Florida, Table 4. Results from several russet-skin clones selected for intermediate testings at Hastings, Florida -- 1989.

Clone	Yield (cwt/A)						Specific gravity	Ratings Appearance/ Rots ^{2/}
	US 1A (Over 1 7/8")	Pick outs (Size A)	Under 1 7/8" (Size B)	Grand total	296	1.061		
B0324-25	256	34	6	291	1.066	6.5	5.5	0
B0324-8	249	34	8	252	1.063	7.0	6.5	0
B0471-3	216	25	11	249	1.074	5.5	0.5	0
B0524-9	215	11	23	253	1.064	8.0	0	0
Nema Rus	212	31	11	238	1.069	7.5	0.5	0.5
B0339-1	210	12	17	237	1.064	7.0	0.5	0.5
Coastal Russet	199	21	17	253	1.060	7.5	0.5	0.5
B0425-5	198	43	12	203	1.076	6.5	0	0.5
B0348-1	192	4	7	240	1.069	7.5	0	0
B0339-17	189	40	12	246	1.067	5.0	0	0
B0324-15	186	51	16	252	1.067	6.0	0	0
B0332-13	186	39	21	242	1.070	4.5	0	0
B0329-1	184	32	27	210	1.069	7.0	0	0
B0303-46	184	13	13	215	1.065	7.5	0.5	0
B0455-8	182	29	5	200	1.067	6.5	0	0
B0324-5	179	18	4	216	1.071	5.0	0.5	0.5
B0348-2	174	31	11	207	1.073	4.5	0	0
B0369-13	173	26	8	238	1.066	6.0	0	0
B0312-10	171	57	11	194	1.062	6.0	0	0
B0303-30	171	15	10	216	1.073	5.5	0	0
B0502-22	169	40	7	206	1.059	6.5	0	0
B0345-11	168	25	13	186	1.082	6.5	0.5	0
B0309-11	164	14	9	206	1.070	7.0	0	0
B0311-12	162	33	12	226	1.057	5.0	1.0	0
B0317-18	159	30	17	203	1.085	5.0	0	0
B0424-22	158	65	3	196	1.073	7.5	0.5	0
B0406-3	158	22	23	207	1.073	4.0	0	0
B0311-2	157	32	8	12				
B0319-26	156							

Florida Table 4, continued

Clone	Yield (cwt/A)			Specific gravity	Ratings Appearance1/ Rots2/
	US 1A (Over 1 7/8")	(Size A)	Pick outs Under 1 7/8"		
B0493-8	155	15	14	183	1.065 5.0 0
B0220-14	155	26	3	183	1.072 7.0 0
B0315-17	150	56	9	216	1.066 4.5 0
B0310-11	149	21	6	175	1.073 7.0 0
B0480-5	147	31	20	197	1.063 5.0 1.0
B0339-16	137	21	33	190	1.073 4.5 0.5
B0367-6	131	41	41	213	1.072 6.0 1.5
B0338-2	128	31	16	175	1.063 6.0 0.5
B0303-19	128	34	8	169	1.071 4.0 0
B0315-4	127	68	6	201	1.070 4.5 1.0
B0369-12	122	18	25	164	1.066 4.5 0.5
B0311-1	108	69	7	184	1.071 6.0 0
B0319-4	98	48	12	158	1.069 4.0 0
LSD	59.8	40.1	9.0	57.4	0.005 2.2 -

1/ From 10.0 = most desirable to 0.0 = completely undesirable.

2/ Rot rating: 0 = none to 5 = 100% rot.

IDAHO

S. Love, A. Thompson, J. Pavek, D. Corsini

Replicated Variety Trials

Potato variety trials were conducted in Shelley, Rexburg, Aberdeen, Kimberly and Parma, Idaho. The sites included both commercial and experiment station fields in locations representing a wide range of environments and soil types. Rexburg and Shelley are commercial sites with relatively high elevations and short seasons (110 and 120 days respectively). Aberdeen, Kimberly and Parma are experiment station sites with longer seasons (130, 140 and 150 days respectively.)

The trials were planted between April 27 and May 13, and harvested between September 20 and October 13. Management practices used were common to the respective areas. Results of the variety trials are summarized in Tables 1-6.

Seven chipping clones (Norchip, Atlantic, Gemchip, A80559-2, AC80545-1, NDA2126-6, NDA2031-1) were evaluated in Rexburg. All of the clones had acceptable fry scores. Gemchip, A80559-2 and AC80545-1 had the highest total and U.S. No. 1 yields. A80559-2 had exceptionally high specific gravity. NDA2031-2 is a cold chipper that performed well with the exception of a high percentage of small tubers.

The overall best russet selections at Rexburg and Shelley were A7411-2 Frontier Russet, NorKing Russet, and A7961-1. At Shelley, Russet Norkotah and HiLite Russet failed to size properly due to extreme early dying pressure. Other russet clones that performed well in the Tri-state (Figure 3), Parma (Figure 4), Aberdeen (Figure 5) and/or Kimberly (Figure 6) trials were A81323-6, A81473-2, A82119-3, A083037-10, A083177-6, C0083008-1, C008014-1, and A8341-5.

The Parma location serves as a selection site for sugar end resistance. Four clones, Lemhi Russet, Frontier Russet, A81727-6 and A7411-2 had relatively low levels of sugar ends. Four clones, Russet Burbank, A81323-6, A7896-7 and A7961-1 had relatively high levels. A7411-2 performed well at all locations and is scheduled for release in late 1990 or early 1991.

Metribuzin Screening

Seven cultivars and twenty-seven breeding selections were screened for metribuzin sensitivity. Plots treated with metribuzin (pot emergent application of 1.0 lb a.i./A) were compared with hand-weeded controls. Foliar injury and predicted yield reduction reported in Table 7. Predicted yield loss was computed using a model constructed from several previous years data. The model required the measurement of foliar injury and plant height following the application of treatments.

Only four cultivars or selections (Atlantic, Shepody, A081216-1 and NDA2031-2) responded with a severe detrimental response to metribuzin. Several other clones developed some foliar injury but had insufficient top growth reduction to indicate a marked yield loss.

Idaho Table 1. 1989 IDAHO POTATO VARIETY TRIAL - REXBURG, IDAHO.

Clone	Total Yield	Yield %	U.S. No. 1's			Culls & U.S.			Spec. Grav.	HH 1	BS ²	Shatter ³	Bruise Color	Fry ⁴	
			>12 oz.	6-12 oz.	<4 oz.	No. 2	oz.								
---cwt/acre---														%	
Atlantic	304	216	71	14	39	20	9	1.097	12	2.0	2.2	1.3			
Russet Burbank	326	165	51	9	26	17	32	1.092	2	3.3	1.7	1.8			
Norchip	284	170	60	5	33	23	17	1.085	0	2.2	2.2	1.0			
Frontier Russet (A74114-4)	285	213	75	15	43	17	8	1.088	0	3.0	1.5	2.7			
Lemhi	301	197	65	15	31	22	12	1.092	8	4.7	1.7	2.5			
Gemchip	385	283	74	15	41	16	10	1.091	0	3.0	2.5	0.8			
Russet Norkotah	253	173	68	13	32	25	7	1.072	5	3.2	1.5	3.0			
A7411-2	341	223	65	16	31	18	16	1.091	0	3.2	1.5	2.3			
Norgold Russet	215	187	71	14	37	22	8	1.071	9	3.3	2.7	3.8			
A80559-2	347	245	71	18	38	18	11	1.111	3	1.8	3.2	1.3			
NorKing Russet	303	215	71	11	38	20	9	1.085	0	3.8	2.8	2.7			
AC80545-1	346	237	68	19	35	14	18	1.097	5	2.5	1.2	1.1			
A7961-1	322	246	76	20	39	13	11	1.092	12	3.7	1.0	2.8			
Shepody	365	252	69	18	39	10	21	1.088	0	3.0	1.0	3.4			
NDA2126-6	344	232	67	10	35	28	5	1.089	2	2.5	3.3	1.5			
Krantz	274	204	74	16	39	15	11	1.078	0	2.7	3.0	1.8			
A79141-3	325	207	64	8	33	26	10	1.095	13	3.5	2.3	1.0			
NDA2031-2	335	230	69	9	36	25	6	1.086	0	1.8	1.0	1.3			
LSD(0.05)		55							0.005		0.5	0.8	0.5		

¹ Hollow heart was measured by cutting tubers >12 oz.² Blackspot Bruise 0-5 scale with 0=resistant, 5=susceptible.³ Relative shatter bruise susceptibility with lowest score = most resistant.⁴ USDA fry grade score with lower score indicating lighter color; potatoes stored at 45°F.

Idaho Table 2. 1989 IDAHO POTATO VARIETY TRIAL - SHELLY, IDAHO.

Clone	Total Yield	Yield %	U.S. No. 1's			Culls & U.S.			Spec. Grav.	HH ¹	BS ²	Shatter ³	Fry ⁴ Bruise Color
			>12 oz.	6-12 oz.	<4 oz.	No. 2	U.S.						
---cwt/acre---													
Russet Norkotah	175	97	55	2	28	35	9	1.074	2	3.3	1.0	3.0	
Russet Burbank	290	132	46	4	26	20	34	1.084	3	3.0	3.2	2.1	
Lemhi	274	134	49	8	22	27	25	1.088	10	4.3	3.0	1.9	
Frontier Russet (A74114-4)	225	160	71	17	37	18	11	1.085	5	2.8	1.5	3.4	
A74111-2	310	197	64	9	35	16	20	1.093	0	3.2	2.5	2.1	
Norgold Russet	260	149	57	7	30	33	9	1.074	24	3.0	3.5	3.3	
NorKing Russet	244	150	61	7	33	24	14	1.084	2	3.3	2.7	2.5	
A7961-1	240	136	57	10	31	17	27	1.092	8	4.2	1.0	2.9	
Shepody	237	150	63	11	35	19	18	1.084	0	3.0	1.5	3.7	
Hilite Russet	187	87	47	0	12	52	2	1.078	0	3.2	2.3	3.6	
Krantz	230	145	63	7	34	21	16	1.081	0	3.0	3.7	2.0	
A79141-3	284	158	56	4	31	28	16	1.092	17	3.3	2.8	1.4	
LSD(0.05)		41		46				0.003	0.4	0.8	0.4		

¹ Hollow heart was measured by cutting tubers >12 oz.² Blackspot Bruise 0-5 scale with 0=resistant, 5=susceptible.³ Relative shatter bruise susceptibility with lowest score = most resistant.⁴ USDA fry grade score with lower score indicating lighter color; potatoes stored at 45°F.

Idaho Table 3. 1989 TRI-STATE POTATO VARIETY TRIAL - ABERDEEN, IDAHO.

Clone	Total Yield	Yield	U.S. No. 1's			<4 U.S.			Culls &			BS ²	Bruise	Shatter ³	Fry Color	
			%	oz.	oz.	No. 2	oz.	No. 2	Spec.	HH ¹	Grav.					
---cwt/acre---														%		
Russet Burbank	397	275	69	17	37	11	19	1.082	5	2.8	2.5				1.9	
Lemhi	365	312	85	27	45	7	7	1.091	25	5.0	3.3				1.2	
A7896-7	356	288	81	9	47	12	7	1.085	0	2.5	2.0				1.0	
A81323-6	393	340	87	38	37	7	7	1.092	8	3.5	1.3				2.1	
A81386-1	278	208	75	18	37	18	7	1.080	3	3.8	1.5				1.1	
A81473-2	345	294	85	29	42	11	4	1.082	33	2.8	3.8				1.8	
A81727-6	289	174	60	4	28	36	3	1.092	0	4.3	3.8				1.3	
A81779-2	283	195	69	7	36	26	6	1.077	8	4.5	3.3				1.5	
A82119-3	301	244	81	19	40	15	4	1.090	13	4.0	2.3				1.4	
A82807-2	291	232	80	16	44	17	3	1.082	8	4.3	4.3				2.9	
A081362-3	372	295	79	13	42	18	2	1.086	0	5.0	2.3				3.4	
A082616-18	349	261	75	11	41	22	4	1.091	3	4.0	3.5				0.9	
A083037-10	451	413	92	33	48	6	3	1.080	3	3.8	2.8				1.8	
A083110-3	394	307	78	14	47	15	6	1.085	30	4.0	2.3				1.5	
A083119-3	367	263	72	14	38	16	12	1.084	0	4.0	3.0				2.4	
A083177-6	397	340	86	26	47	10	5	1.084	18	3.8	2.0				1.3	
C0083008-1	344	296	86	28	45	10	4	1.087	0	2.0	2.8				1.3	
C0083021-1	317	280	88	31	44	7	4	1.089	15	2.8	1.0				1.2	
GH-13	365	243	67	6	31	24	9	1.082	0	3.5	3.0				2.0	
GH-16	301	204	68	16	38	14	19	1.084	8	2.0	2.0				2.2	
GH-17	315	207	66	11	38	15	19	1.085	13	2.8	2.3				2.1	
LSD(0.05)	346	270						0.003	0.7	0.8	0.4					

¹ Hollow heart was measured by cutting tubers >12 oz.² Blackspot Bruise 0-5 scale with 0=resistant, 5=susceptible.³ Relative shatter bruise susceptibility with lowest score = most resistant.⁴ USDA fry grade score with lower score indicating lighter color; potatoes stored at 45°F.

Idaho Table 4. 1989 ADVANCED POTATO VARIETY TRIAL - PARMA, IDAHO.

Clone	U.S. No. 1's			Culls & U.S.			Spec.	BS ²	Bruise	Fry ³ Color	Sugar ⁴ Ends
	Total Yield	Yield %	>12 oz.	6-12 oz.	<4 oz.	No. 2					
---cwt/acre---											
Russet Burbank	449	221	49	5	23	25	26	1.071	30	3.5	2.5
A7896-7	534	231	43	9	26	6	51	1.083	18	3.5	1.8
A81727-6	471	280	59	2	30	32	9	1.096	3	4.0	1.3
Lemhi	522	387	74	28	37	8	18	1.074	90	5.0	1.2
A81323-6	428	179	42	12	21	7	51	1.078	48	3.3	1.9
A82119-3	528	433	82	13	50	10	8	1.088	28	3.5	1.3
C008014-1	465	327	70	15	42	11	19	1.073	20	3.0	1.9
Frontier Russet	327	238	73	26	37	10	17	1.071	23	3.0	1.3
A7411-2	466	221	47	4	22	23	30	1.091	5	4.3	1.2
A7961-1	526	407	77	23	44	9	14	1.088	68	4.0	1.7
LSD(0.05)	105	111					0.007	0.6	0.4	0.4	23

¹ Hollow heart was measured by cutting tubers >12 oz.

² Blackspot Bruise 0-5 scale with 0=resistant, 5=susceptible.

³ USDA fry grade score with lower score indicating lighter color; potatoes stored at 45°F.

⁴ Percentage of tubers producing fries with ends rated 3+ and at least one full point darker than the remainder of the fry.

Idaho Table 5. 1989 ADVANCED POTATO VARIETY TRIAL - ABERDEEN, IDAHO.

Clone	Total Yield	Yield %	U.S. No. 1's		<4 oz.		Culls & U.S.		Spec. Grav.	HH ¹	BS ²	Bruise	Fry ³ Color
			>12 oz.	6-12 oz.	oz.	oz.	No. 2	Grav.					
<hr/> ---cwt/acre---													
Russet Burbank	312	228	73	15	40	7	20	1.079	0	2.0	2.3		
Lemhi	323	271	84	36	35	7	8	1.089	5	4.2	1.2		
Frontier Russet (A74114-4)	289	240	83	30	42	8	8	1.084	0	2.1	2.3		
A7411-2	393	354	90	40	39	4	6	1.092	0	3.1	1.2		
A7816-14	392	353	90	37	44	4	7	1.090	3	1.6	2.1		
A7896-7	318	274	86	31	42	7	8	1.082	0	2.1	1.1		
A7961-1	358	308	86	52	28	2	11	1.088	3	3.4	2.0		
A79340-8	274	252	92	48	38	4	4	1.082	0	2.4	1.6		
A80285-1	300	264	88	24	45	10	2	1.086	0	3.0	1.0		
A81323-6	366	329	90	33	43	6	4	1.091	0	3.6	2.0		
A81323-38	224	205	84	39	35	8	8	1.089	5	4.0	2.3		
A81386-1	334	301	90	38	38	5	4	1.081	5	4.2	1.2		
A81473-2	354	336	95	52	35	4	1	1.078	3	1.6	1.9		
A8333-2	240	223	93	52	33	2	5	1.084	48	4.0	2.6		
A8341-5	273	232	85	5	51	13	2	1.084	0	1.3	0.6		
A83234-8	375	330	88	28	46	5	7	1.090	10	2.7	2.8		

¹ Hollow heart was measured by cutting tubers >12 oz.² Blackspot Bruise 0-5 scale with 0=resistant, 5=susceptible.³ USDA fry grade score with lower score indicating lighter color; potatoes stored at 45° F.

Idaho Table 6. 1989 ADVANCED POTATO VARIETY TRIAL - KIMBERLY, IDAHO.

Clone	Total Yield	Yield	U.S. No. 1's			Culls & U.S.			Spec. Grav.	HH ¹	BS ²	Bruise	Fry ³ Color
			>12 oz.	12 oz.	<4 oz.	No. 2	Grav.						
---cwt/acre---													
Russet Burbank	495	277	56	13	33	11	32	1.074	1	2.6	2.0		
Lemhi	486	418	86	33	42	8	6	1.086	38	4.6	1.7		
Frontier Russet (A74114-4)	461	392	85	29	42	11	4	1.076	3	2.8	2.9		
A7411-2	606	527	87	55	27	5	8	1.088	0	3.4	2.0		
A7816-14	570	496	87	52	30	6	8	1.082	0	2.5	2.7		
A7896-7	560	325	58	17	34	6	36	1.076	3	2.5	1.2		
A7961-1	524	482	92	52	34	4	4	1.078	0	3.2	2.0		
A79340-8	616	567	92	48	40	3	5	1.084	3	3.2	2.3		
A80285-1	482	400	83	16	46	15	2	1.078	0	3.1	2.1		
A81323-6	497	427	86	39	37	8	6	1.083	40	3.8	2.4		
A81323-38	385	243	63	6	37	22	15	1.085	1	4.6	1.2		
A81386-1	499	434	87	48	31	6	7	1.078	3	3.8	1.3		
A81473-2	530	493	93	57	30	4	2	1.072	40	3.2	2.2		
A8333-2	520	478	92	24	52	8	1	1.084	18	4.5	3.0		
A8341-5	516	454	88	24	50	10	3	1.083	5	2.1	1.6		
A83234-8	575	477	83	49	29	6	10	1.088	40	3.6	2.6		

¹ Hollow heart was measured by cutting tubers >12 oz.

² Blackspot Bruise 0-5 scale with 0=resistant, 5=susceptible.

³ USDA fry grade score with lower score indicating lighter color; potatoes stored at 45°F.

Idaho Table 7. Reaction of potato clones to the herbicide metribuzin as measured by foliar injury and yield reduction.

Clone	Tuber Type	Foliar Injury ¹ 21 days Following Application	Predicted Yield ² Reduction Due to Application
		-----%-----	
Atlantic	Round, White	63	35
Lemhi	Long, Russet	0	0
Norchip	Round, White	15	3
Norgold	Oblong, Russet	0	0
Red LaSoda	Round, Red	5	0
Russet Burbank	Long, Russet	10	0
Shepody	Long, White	88	69
A7816-14	Long, Russet	25	1
A7961-1	Long, Russet	10	0
A80559-2	Round, White	5	0
A81323-6	Long, Russet	15	0
A81473-2	Oblong, Russet	20	2
A81727-6	Oblong, Russet	28	2
A82119-3	Oblong, Russet	20	2
AC77101-1	Oblong, Russet	5	0
AC7869-17	Oblong, Russet	3	0
AC80545-1	Round, White	5	0
AC81198-11	Oblong, Russet	5	0
A081216-1	Long, Russet	68	39
A082283-1	Long, Russet	20	0
A082611-7	Long, Russet	23	9
A082616-18	Long, Russet	0	0
A083037-10	Oblong, Russet	10	0
A083119-3	Long, Russet	8	0
A083177-6	Oblong, Russet	3	0
BC0038-1	Long, White	23	4
C07918-11	Oblong, Russet	8	0
C08011-5	Oblong, Russet	20	1
C0083008-1	Long, Russet	0	0
NDA2031-2	Round, White	28	13
ND01496-1	Round, White	8	0
NDTX8-731-1R	Round, Red	18	3
NDTX9-1068-11R	Round, Red	25	2
TND329-1Russ	Long, Russet	23	3

¹ Metribuzin applied postemergence (8 inch plants) at a rate of 1.0 lb a.i./A (17.5gpa, 30psi).

² Yield reduction was calculated using the model: $\{1 - [(.820063 + .238239 \frac{\text{plant height treat}}{\text{plant height control}}) - .000086 (\% \text{ foliar injury})^2]\} \times 100$.

LOUISIANA

James F. Fontenot, Gene Shaver, P. W. Wilson, W. A. Young, and W. A. Meadows

Introduction

The objectives of the Louisiana potato breeding project remain the same but, the procedure is different since the seedling tubers produced in the greenhouse are not initially planted in the north (Wisconsin) as in the past. These first-year seedlings are planted in Louisiana and thus more emphasis is put on the environmental stress objectives such as drought, heat, frost, and air pollution tolerance. The goals of high yield and wide adaptability are not being diluted; neither are the objectives of improved culinary quality, storage ability, tuber type, insect resistance, and disease resistance neglected.

Diverse genetic stock that possess genes for desired characters are used as parental lines and crosses are made in the greenhouse and field. True seed derived from these crosses are planted in the greenhouse in early November. These seedlings are allowed to grow to a height of one to two inches and then transplanted to three-inch pots and allowed to grow to maturity, which is early March. Probably only 50 percent will show sufficient promise to warrant further testing. Discards are made due to poor yield, shape, color, and absence of other desirable characters. The selected clones are placed in storage at 40° F and 85 percent relative humidity until early August then planted in a field test plot at Baton Rouge, Louisiana. Natural stress conditions such as high temperature, drought, and high ozone levels exist at this time of year as well as a high insect population. Conditions of this type make it ideal to screen for virus diseases, too. These clones are harvested in early December in order to take advantage of the average first killing frost, which occurs on November 20.

Replicated trials are conducted to help evaluate all advanced clones. Some of the characters used to screen these clones are plant vigor, maturity, and yield. After yield is taken, specific gravity, chipping, boiling, and after-cooking darkening information is utilized to eliminate the undesirable lines.

Louisiana and Nebraska Trials

True seed of 15 families were planted in the greenhouse at Louisiana State University on October 30, 1989 and 249 clones were considered worthy of selection on February 13 and 14, 1990. These clones will be sent to Scottsbluff, Nebraska in mid-May for field planting.

The number of clones selected in the greenhouse at LSU increased to 254 in 1989. These individuals came from 16 families but, most clones were from LaBelle XND860-2; La. 43-18 XND860-2; and MS716-15XND860-2 crosses. This North Dakota line was used as a parent extensively since its tubers can be chipped

out of cold storage and the chips graded in the acceptable class. Seed from these families were not planted till early January because we were having heating problems in the greenhouse. This resulted in April harvest which made for dormancy circumstances which followed field planting at Scotts-bluff, Nebraska in early June. The consequences were such that approximately 80% of the clones were saved for planting in 1990. This is more than we like to keep; yet some good were: 91-1; 91-11; 91-17; 91-25; 91-30; 91-33; 91-40- 91-56; 91-78; 93-83; 93-84; 93-98; 92-119; 91-129; 91-163; 91-164; 91-184; 91-202; 91-221 and 91-226.

The only 1986 clone remaining after four years research is 61-22 (Table 1). Five 1987 clones (Table 1) have performed well in Louisiana and Nebraska. The number of 1988 worthy lines for continued research is now down to eight, these lines are also in Table 1. The following clones 81-9; 81-20; 81-42; 81-107 and 81-167 were rated excellent in chipping ability.

In October of 1989 the Director of the Louisiana Agriculture Experiment Station approved the release of LaBelle. LaBelle is a round-blocky, white skinned, white fleshed, smooth, shallow-eyed potato cultivar that is widely adapted and medium late in maturity. It produces a high total yield and a very high percent of number one grade tubers. LaBelle was rated first in overall merit in the 1984-1985 North Central Regional trials. Though this cultivar is medium-late in maturity in Louisiana it sizes fast in maturity in Nebraska and is medium-early in that state. Tubers keep well in commercial storage and are suitable for dual purposes as a food. LaBelle and Atlantic were entered in many chipping tests in 1989 and evaluated by as many as five different panelists. The average color score of those two cultivars were identical 1.8 (1 = very white; 10 = very dark brown). The performance of LaBelle and La. 12-59 compared to Red LaSoda and Kennebec in Baton Rouge in 1989 is presented in Table 2.

The north central regional potato trials was planted in Baton Rouge on 2/24/89 and harvested 6/13/89. The top five clones in the trial were first W855, second MS700-70; third NEA 22.75-1, fourth ND 2224.5R and fifth Norchip (Table 3).

Louisiana, Table 1. Some advanced clones showing promise in Louisiana and Nebraska.

CLONE NO.	PARENTAGE	REMARKS
61-22	01-38XND860-2	Medium maturity and vigor; gravity 71; chip 1.0
72-13	12-59X	Late; med. vigor
72-14	12-59X	Late; good vigor and type
72-17	12-59X	Late; med. vigor; good type
71-61	G670-11X	Late; good vigor and type, oblong
71-63	G670-11X	Very late; very vigorous, super type, long rest.
81-9	01-38XND860-2	Med. maturity; fair vigor
81-20	01-38XND860-2	Med. maturity, good vigor and type
81-42	01-38XW879	Very late; good vigor; excellent type
81-44	01-38XW879	Late; good vigor
81-107	12-59XND860-2	Late; good vigor and type
81-134	BN9803-1XND860-2	Late; good vigor and type
81-159	BN9803-1X	Late; fair vigor
81-167	ND860-2XW879	Very late, very vigorous

Louisiana, Table 2. Preformance of LaBelle and La. 12-59 compared to Red LaSoda and Kennebec in Baton Rouge in 1989.

Selection Number or Variety	t/ha Av. Yield Total	t/ha Av. Yield U.S. #1	Specific Gravity	Comments and General Notes
Red LaSoda	17.9	9.0	1.060	Vigorous, medium
Kennebec	21.3	11.2	1.062	Vigorous, late
LaBelle Nebraska	25.8	15.7	1.064	Vigorous, medium, late
LA 12-59 Nebraska	28.0	16.8	1.064	Very vigorous, medium
LaBelle - Maine	23.5	13.4	1.064	Very vigorous, very late
La 12-59 Maine	13.4	6.7	1.064	Very vigorous, medium

Louisiana, Table 3. Summary sheet of regional trial conducted in 1989.

Selection Number or Variety	Aver. Mat.	Most (2) Representative Scab Area- Type (A-T)	CWT/A Aver. Yield	CWT/A Yield US #1	Aver. Percent US #1	Aver. % Total Solids	Gen (4) Merit Rating	Chip (5) Color
EARLY TO MEDIUM MATURITY								
Norland	1	0	200	123	62	16.0	5	
Norgold Russet	4	0	143	85	59	16.5	9	
Norchip	4	0	180	115	64	18.8	5	3
ND1196-2R	1	0	138	75	54	16.2	7	
MEDIUM LATE TO LATE MATURITY								
MN13420	1	0	150	88	59	15.0	8	
MN13451	1	0	83	43	52	16.2	5	5
MN13545	1	0	55	23	42	17.5	5	
MS700-70	4	T-1	163	110	68	18.4	2	
NEA219.70-3	4	T-1	203	120	59	15.4	4	
NEA22.75-1	4	T-1	210	165	79	15.6	3	9
BN9826-1	5	T-1	155	108	70	14.8	9	
ND2224-5R	1	0	188	103	55	15.2	4	
ND1538-1Russ	4	0	163	98	60	15.0	7	
W855	4	T-1	263	165	63	19.2	1	5
W1005	4	0	108	83	77	17.5	8	
Red Pontiac	3	T-1	278	185	67	14.8	9	
Russet Burbank	5	0	230	113	49	17.7	6	

1/ 1-Very Early - Morland maturity; 2-Early - Irish Cobbler maturity; 3-Medium - Red Pontiac maturity;

4-Late - Katahdin maturity; 5-Very Late - Kennebec or Russet Burbank maturity.

2/ AREA: T-less than 1%; 1-10-20%; 2 - 21-40%; 3 - 41-60%; 4 - 61-80%; 5 - 81-100%. TYPE: 1. Small,

superficial; 2. Larger, superficial; 3. Larger, rough pustules; 4. Larger pustules, shallow holes; 5. Very large pustules, deep holes.

3/ Percent total solids, not total solids/acre.

4/ Place top five among all entries including check varieties; disregard maturity classification. (Rate first, second, third, fourth and fifth (in order) for over all worth as a variety).

5/ Chip color - 1 = very white 10 = very dark brown.

Maine

G.A. Porter, J.A. Sisson, and M. Buck
University of Maine

Introduction: Forty-nine potato varieties and clones were tested at Aroostook Farm, Presque Isle, Maine as part of the NE107 Regional Project (Breeding and Evaluation of Potato Clones for the Northeast). The primary objective of this trial is to determine performance, quality, and storage characteristics of promising potato clones and new varieties in Maine.

Methods: Single-row plots, 25 feet long were hand planted on May 23, 1989 using a randomized complete block design and six replications. Seedpieces of round-whites and reds were spaced either eight or ten inches apart, while most russets were spaced 12 inches apart. The exception was Russet Burbank which was spaced at 16 inches. Plots were located on a Caribou loam soil typical of the area. All varieties were grown following a plowed down timothy/clover sod on a site with a soil pH of 4.7. Early, medium maturing and red skinned varieties were fertilized with 900 lbs/A of 14-14-14, banded at planting. Late and russeted varieties received 1100 lbs/A of the same fertilizer blend. On May 22, EPTC was applied at the labeled preplant incorporated rate for grass control. Linuron (1.0 lbs ai/A) was applied on June 5 for broadleaved weed control. Cultural practices were similar to those used on commercial farms in the area and varieties were grouped so that separate tests could be vinekilled and harvested based on maturity classification. Specific gravity was determined at harvest using the weight-in-air, weight-in-water method. Hollow heart ratings indicate the number of hollow tubers observed per 40 large tubers examined. Chip color evaluations were conducted on December 15, 1989, following storage at 50° F. Chips were fried at 350° F until bubbling stopped and evaluated based on Potato Chip Institute Chart 1206-U.

Results:

General Growth and Plant Stands. Dry growing conditions occurred early during the 1989 season; however, rainfall during May and August was adequate. Rainfall for May, June, July, August totaled 4.17, 2.35, 3.02, and 4.49 inches, respectively. No stand problems were evident in this trial. Adequate canopy growth occurred by midsummer in most clones. Weak canopy growth was characteristic of AF879-3, B9792-61, Red Gold, B9955-33, B9955-46.

Disease Incidence. Early blight became a severe problem for several varieties in the russet trial, but was not observed to any degree in the round-white trials. Early blight lesions were first observed during late August and by September 5 BelRus had been 50 percent defoliated.

Early Maturity Trial. CS7697-24 continues to compare favorably with Superior as an early maturing table selection; however, none of the varieties tested

produced significantly higher yields than Superior (Maine Tables 1 and 2). With the exception of CS7697-24, none of the test selections appear particularly promising as early table clones. AF879-3, B0257-3 and B9792-61 had acceptable chip colors and specific gravities; however, yields were not impressive. Continued testing of these clones is necessary.

Red-Skinned Trial. Three special purpose table varieties were tested in this trial and compared with Norland and Kennebec (Maine Tables 1 and 2). Each has unique characteristics which may provide marketing opportunities for Maine seed and tablestock growers. LaRouge is a very high yielding variety with seed export potential but has deep eyes and a rough external appearance. Red Gold is low yielding and produces small tubers with a pale pink skin, but its yellow flesh and excellent flavor may provide some specialty marketing opportunities. Sangre is quite late in maturity and produces moderate yields of relatively small-sized tubers; however, tuber appearance is excellent and its deep red color should result in a very attractive washed specialty pack.

Medium Maturity Trial. None of the test clones produced total or marketable yields which exceeded those of Kennebec (Maine Table 3). For tablestock utilization, F77087 was most promising with moderate yields, large tuber size and excellent appearance (Maine Tables 3 and 4). It reportedly has some common scab resistance, but may be susceptible to hollow heart. B9955-46 and Saginaw Gold may also have potential for tablestock use; however, yields of Saginaw Gold were not exceptional in this trial.

Several promising chipping selections appeared in this trial. Excellent chip colors were obtained from AF875-15, AF875-16, AF875-17, B9792-61, B9792-157, B9792-158, B9955-33, and B9955-46. Yields of Saginaw Gold, AF875-15, AF875-16, B9792-157, B9792-158, B9955-46, were all within acceptable limits for chipping selections. Specific gravity of AF875-15, AF875-16, and B9792-158 compared very favorably with those of Atlantic. Based on yield, specific gravity and chip color data over the last two to three years AF875-16, B9792-157, and B9792-158 are our most promising chipping selections.

Late Maturity Trial. The most promising tablestock selections in the late maturity trial were Allegany, AF828-5, AF1060-2, B0172-15, and CS7635-4. These selections combine high yields, attractive tuber appearance, and acceptable tuber size (Maine Table 5 and 6). Only AF1060-2 produced significantly higher total yields than Katahdin, while marketable yields of AF1060-2 and B0172-15 were significantly higher than Katahdin. Hollow Heart may be a problem in B0172-15. Chip colors were acceptable for B9792-2B, B9792-8B, B9955-11 and WNC672-2 (Maine Table 6).

Russet-Processing Trial. None of the clones in this trial produced total yields which rivaled Russet

Burbank (Maine Table 7); however, marketable yields of A74114-4, AF522-5 and B0045-6 significantly exceeded those of both Russet Burbank and BelRus. A74114-4 sized very well relative to the other clones. Specific gravities of all clones were quite high. Tuber appearances of all test selections were better than those of BelRus and Russet Burbank (Maine Table 8). BelRus tubers had surprisingly poor appearance ratings due to very uneven russetting. AF522-5 and B0045-6 had excellent tuber appearance for fresh market use; however, serious hollow heart problems were observed in B0045-6. Fry colors of BelRus, B0045-6, and B0220-14 were acceptable from storage in December. Based on tuber length and other characteristics B0220-14 has the best overall potential for french fry utilization. The two outstanding tablestock selections in this trial were A74114-4 and AF522-5.

Storage Evaluations. Limited data on storage and processing characteristics were collected from 38 varieties and clones grown during the 1988 growing season (Maine Tables 9 and 10). French fry quality of several selections was evaluated under simulated processing conditions (Maine Table 9). None of these clones produced french fries that were rated superior to Russet Burbank in texture. Texture indices were quite good for AF522-5, B0045-6 and B0220-14. Fries from A7411-2 were judged significantly grayer than those of Russet Burbank. French fry quality (color, uniformity and texture) of B0220-14 was outstanding.

Chip colors from 50°F storage in February were excellent for Kanona, Steuben, AF875-16, B0220-14, B0172-15, B0240-11, B0242-2, B0243-18, B9792-8B, B9792-61, B9792-157, B9792-158, and NY79 (Maine Table 10). None of the selections produced acceptable chips from 38°F storage; however, Kanona, AF875-16, B0220-14, B9792-61, and B9792-158, reconditioned successfully from this temperature. After cooking darkening scores were poorer than Katahdin for five selections. The following selections were rated particularly poor in this characteristic: AF465-2, AF474-2 and B9792-158. Washed appearance ratings were particularly outstanding for Allegany, Kanona, BelRus, Sangre, Katahdin, B0045-6, B9792-158 and B9922-11. Tuber dormancy was exceptionally short for Ontario, B0242-2, B9792-8B, B9792-61, and WNC672-2. Selections with the lowest storage weight loss were Allegany, Russet Burbank, Sangre, B9922-11 and CS7635-4.

Overall Summary. Selections which appear particularly promising as tablestock round whites are CS7697-24 (early), CS7635-4 (late), and Allegany (late). AF828-5 and AF1060-2 were outstanding in their first year of testing, but additional observations are needed. WNC672-2 may have potential for dual-purpose chipping and table use. Allegany and CS7635-4 may also fill this role under some circumstances; however, late vine maturity will likely limit chipping use of these selections in Maine. A74114-4 was the top performing russetted line with apparent potential for table use. AF522-5 produces higher yields than BelRus and is a good quality russet for tablestock utilization. French fry quality of B0220-14 is outstanding; however, yields have not been acceptable.

Maine Table 1. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for early maturing and red-skinned varieties grown at Presque Isle, Maine - 1989.

Variety	Total Yield cwt/A	Marketable Yield percent cwt/A of std.	Size Distribution by Class ¹ (%)						Size Distribution (%) 1-7/8 to 4 in. 2-1/2 to 4 in. Specific Gravity
			1	2	3	4	5	6	
<u>Early Test-100 days</u>									
Superior (std)	301	263	100	5	12	17	48	17	95
Chaleur	284	235	89	4	13	17	54	11	95
Eramosa	263	221	84	6	14	21	47	11	94
Norchip	267	197	75	10	29	28	31	2	90
AF845-11	285	242	92	3	10	18	48	21	97
AF879-3	242	210	80	9	23	27	36	6	91
B0257-3	253	222	84	14	32	31	23	0	86
B9792-61	233	187	71	5	11	16	53	14	1
CS7697-24	314	263	100	6	15	22	44	13	94
Waller Duncan LSD (K=100)	38	50							56
 <u>Red-skinned Test-108 days</u>									
Kennebec (std)	359	286	100	2	12	19	57	10	98
LaRouge	385	269	94	8	21	21	42	8	92
Norland	270	198	69	7	21	23	47	2	93
Redgold	282	212	74	13	28	24	32	2	87
Sangre	338	250	87	10	28	22	32	8	90
Waller Duncan LSD (K=100)	42	45							40
									0.004

1 Size classes for all varieties: 1=1-1/2 to 1-7/8"; 2=1-7/8 to 2-1/4"; 3=2-1/4 to 2-1/2"; 4=2-1/2 to 3-1/4"; 5=3-1/4 to 4"; 6=over 4".

Maine Table 2. Plant size, maturity at vinekill, tuber shape, tuber defects, hollow heart ratings, and chip color indices for early maturing and red-skinned varieties grown at Presque Isle, Maine - 1989.

Variety	Plant Data ¹			Tuber Data ¹			Tuber Defects (%)			Hollow Heart Rating ²			Chip Color Index ³		
	Size 7-20	Vine Matur. at Vinekill	Matur. at Vinekill	Shape	Apear- ance	Total	Sun- burn	Miss- shapen	Growth cracks	Hollow	Heart	Rating	Hollow	Heart	Rating
<u>Early Test-100 days</u>															
Superior (std)	7	3	3	3	6	4.8	2.2	2.5	0.1	2	6.9				
Chaleur	6	3	3	2	7	9.0	3.7	5.3	0.0	1	9.4				
Eramosa	5	1	2	2	7	8.8	0.6	8.0	0.1	0	8.6				
Norchip	6	5	5	2	5	11.6	2.8	8.5	0.2	0	4.8				
AF845-11	6	3	3	3	5	12.9	1.6	10.6	0.7	0	6.8				
AF879-3	4	4	3	2	8	3.6	1.1	2.4	0.1	0	5.1				
B0257-3	7	4	4	3	6	3.5	2.0	1.5	0.1	1	5.1				
B9792-61	3	3	4	3	6	12.1	0.7	5.9	5.5	2	4.2				
CS7697-24	8	4	3	2	7	7.3	2.9	3.4	1.0	0	8.4				
<u>Red-skinned Test-108 days</u>															
Kennebec (std)	7	6	6	4	5	20.6	5.3	12.7	2.7	0					
LaRouge	8	3	5	3	6	21.5	0.9	19.3	1.4	1					
Norland	6	2	2	4	8	20.4	0.5	9.4	10.5	0					
Redgold	8	3	4	3	5	12.0	2.7	8.4	0.9	0					
Sangre	5	6	7	3	8	15.9	3.2	9.5	3.2	0					

¹See standard NE107 rating system for key to codes.

²Hollow heart rating equals number of hollow tubers found per 40 large tubers cut and examined.

³Chip color indices -- lower indices indicate lighter color: 1-/ acceptable; >7 unacceptable; Waller Duncan LSD (K=100) for chip color = 0.5.

Maine Table 3. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for medium maturing varieties grown at Presque Isle, Maine - 1989.

Variety	Total Yield cwt/A	Marketable Yield percentage cwt/A of std.	Size Distribution by Class ¹ (%)					Size Distribution(%) 1-7/8 to 4 in. 2-1/2 to 4 in. 6 over 4 in.	Specific Gravity
			1	2	3	4	5		
<u>Medium Test-108 days</u>									
Kennebec (std)	378	302	100	4	14	22	51	10	96
Atlantic	337	276	91	3	12	14	55	15	0
Saginaw Gold	338	256	85	5	15	18	50	13	0
AF875-15	304	242	80	5	18	24	46	7	0
AF875-16	297	250	83	4	15	22	51	8	0
AF875-17	250	179	59	7	25	24	41	3	0
B9792-61	239	208	69	5	11	19	52	13	0
B9792-157	349	281	93	6	15	18	50	11	1
B9792-158	351	301	100	4	15	21	45	15	0
B9955-33	281	206	68	8	13	20	52	8	0
B9955-46	322	297	98	3	9	13	53	21	0
F77087	306	281	93	3	11	16	60	9	0
LA01-38	326	304	101	4	14	21	50	11	0
WF31-4	319	268	89	2	13	19	54	12	0
73C26-1	315	268	89	6	23	33	36	2	0
Waller Duncan									
LSD (K=100)	49	67							0.004

¹Size classes for all varieties: 1=1-1/2 to 1-7/8"; 2=1-7/8 to 2-1/4"; 3=2-1/4 to 2-1/2"; 4=2-1/2 to 3-1/4"; 5=3-1/4 to 4"; 6=over 4".

Maine Table 4. Plant size, maturity at vinekill, tuber shape, tuber defects, hollow heart ratings, and chip color indices for medium maturing varieties grown at Presque Isle, Maine - 1989.

Variety	Plant Data ¹			Tuber Data ¹		Tuber Defects (%)			Hollow Heart Rating ²	Chip Color Index ³
	Size 7-20	Vine Matur. at Vinekill	Matur. at Vinekill	Shape	Appearance	Total	Sun- burn	Mis- shapen	Cracks	
<u>Medium Test-108 days</u>										
Kennebec (std)	8	6	6	4	5	16.7	6.5	8.8	1.4	0
Atlantic	7	5	5	2	6	12.0	1.6	9.2	1.2	2
Saginaw Gold	7	2	3	2	5	19.0	2.6	16.3	0.1	2
AF875-15	6	3	3	3	4	16.8	2.2	11.4	3.2	1
AF875-16	6	5	5	2	6	15.0	6.3	8.6	0.2	2
AF875-17	5	3	3	2	5	17.7	2.6	14.7	0.5	0
B9792-61	4	4	4	2	7	11.0	0.9	6.9	3.3	1
B9792-157	6	5	4	2	4	14.7	2.3	11.9	0.5	1
B9792-158	7	6	6	3	5	9.1	2.7	6.5	0.0	3
B9955-33	5	3	3	2	7	17.0	8.3	8.7	0.1	0
B9955-46	5	3	3	2	6	10.2	2.6	7.2	0.5	0
F77087	4	5	4	3	8	8.0	4.3	3.4	0.3	4
LA01-38	5	5	5	3	7	4.5	2.3	2.2	0.0	0
WF31-4	5	5	5	2	6	12.6	0.4	8.7	3.4	1
73C26-1	6	6	6	2	7	6.8	0.5	5.5	0.8	1
										7.6

¹See standard NE107 rating system for key to codes.

²Hollow heart rating equals number of hollow tubers found per 40 large tubers cut and examined.

³Chip color indices -- lower indices indicate lighter color: 1-7 acceptable; >7 unacceptable;
Waller Duncan LSD (K=100) for chip color = 0.7.

Maine Table 5. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for late maturing varieties grown at Presque Isle, Maine - 1989.

Variety	Total Yield cwt/A	Marketable Yield percentage cwt/A of std.	Size Distribution by Class ¹ (%)						Specific Gravity
			1	2	3	4	5	6	
<u>Late Test-119 days</u>									
Katahdin (std)	452	367	100	3	6	11	46	33	95
Allegany	454	368	100	1	7	12	41	32	92
Ontario	476	377	103	6	21	26	44	2	93
AF828-5	438	393	107	3	10	14	55	18	97
AF1060-2	500	436	119	4	11	18	47	17	94
B0172-15	439	415	113	2	4	10	48	35	1
B9792-2B	323	266	72	2	11	20	49	16	97
B9792-8B	448	357	97	3	11	22	49	15	0
B9955-11	327	279	76	3	11	19	56	12	0
CS7635-4	441	398	108	1	5	10	53	30	2
NY78	429	353	96	3	8	10	43	34	2
WNC672-2	395	344	94	1	6	14	58	20	1
Waller Duncan LSD (K=100)	36	44							0.004

¹Size classes for all varieties: 1=1-1/2 to 1-7/8"; 2=1-1/4 to 2-1/4"; 3=2-1/4 to 2-1/2"; 4=2-1/2 to 3-1/4"; 5=3-1/4 to 4"; 6=over 4".

Maine Table 6. Plant size, maturity at vinekill, tuber shape, tuber defects, hollow heart ratings, and chip color indices for late maturing varieties grown at Presque Isle, Maine - 1989.

Variety	Plant Data ¹			Tuber Data ¹			Tuber Defects (%)			Hollow Heart Rating ²			Chip Color Index ³				
	Size 7-20	Vine Matur. at Vinekill	Matur. at Vinekill	Shape	Apear- ance	Total	Sun- burn	Mis- shapen	Growth cracks	Hollow	Heart	Rating ²	Hollow	Heart	Rating ²	Chip	Color
Late Test-119 days																	
Katahdin (std)	8	8	7	2	7	15.8	9.4	5.5	0.8	1	1	8.4					
Allegany	8	7	7	2	7	8.3	6.4	1.7	0.3	0	0	7.7					
Ontario	9	9	8	3	3	14.0	3.7	9.3	0.9	0	0	9.2					
AF828-5	7	6	7	3	7	7.6	4.8	1.5	1.2	0	0	8.8					
AF1060-2	7	7	7	2	7	7.5	4.2	2.8	0.5	0	0	8.4					
B0172-15	7	8	7	4	6	5.6	1.4	3.8	0.4	2	2	7.1					
B9792-2B	6	5	3	3	4	16.1	3.2	9.5	3.4	0	0	4.2					
B9792-8B	8	7	8	3	5	14.3	2.8	10.6	1.0	0	0	6.5					
B9955-11	6	6	6	2	4	9.5	1.4	6.6	1.6	0	0	4.6					
CS7635-4	8	8	7	2	7	8.0	2.4	4.0	1.5	0	0	7.5					
NY78	7	7	8	2	7	11.1	4.8	5.7	0.6	0	0	8.2					
WN0672-2	8	7	7	2	8	8.8	1.0	7.6	0.2	0	0	6.6					

¹See standard NE107 rating system for key to codes.

²Hollow heart rating equals number of hollow tubers found per 40 large tubers cut and examined.

³Chip color indices -- lower indices indicate lighter color: 1-7 acceptable; >7 unacceptable; Waller Duncan LSD (K=100) for chip color = 0.5.

Maine Table 7. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for russeted or processing varieties grown at Presque Isle, Maine - 1989.

Variety	Total Yield cwt/A	Marketable Yield percentage cwt/A of std.	Size Distribution by Class ¹ (%)					Specific Gravity	
			1	2	3	4	5		
<u>Russet/Processing Test-119 days</u>									
R. Burbank (std)	431	187	100	17	45	27	7	5	38
Bel Rus	252	234	125	33	55	11	1	0	12
A74114-4	332	307	164	15	41	28	13	4	44
AF522-5	301	275	147	28	52	15	5	0	20
B0045-6	345	311	166	21	50	22	6	1	29
B0220-14	282	231	124	16	46	33	5	1	38
CS7984-3	317	260	139	20	49	24	7	0	31
Waller Duncan								7	7
LSD (K=100)	24	30							0.005

¹Size classes for all varieties: 1= 0 to 4 oz.; 2= 4 to 8 oz.; 3= 8 to 12 oz.; 4= 12 to 16 oz.; 5= over 16 oz.

Maine Table 8. Plant size, maturity at vinekill, tuber shape, tuber defects, hollow heart ratings, and chip color indices for russeted or processing varieties grown at Presque Isle, Maine - 1989.

Variety	Plant Data ¹		Tuber Data ¹		Tuber Defects (%)			Hollow Heart Rating ²	Chip Color Index ³
	Size 7-20	Vine Matur. at Vinekill	Matur. at Vinekill	Shape	Apear- ance	Total burn shapen cracks	Sun- Mis- Growth		
<u>Russeted/Processing Test-119 days</u>									
R. Burbank (std)	9	9	9	7	2	56.6	1.7	52.0	2.9
BelRus	6	5	2	6	3	6.0	0.9	5.0	0.1
A74114-4	5	6	6	7	5	8.6	3.0	5.3	0.3
AF522-5	8	5	2	5	8	7.0	1.8	4.7	0.5
B0045-6	8	6	6	6	7	11.1	2.1	8.7	0.3
B0220-14	8	4	3	6	6	18.2	4.4	13.8	0.0
CS7984-3	8	6	5	3	7	18.3	6.2	11.1	1.0
								0	0
									7.6

¹See standard NE107 rating system for key to codes:

²Hollow heart rating equals number of hollow tubers found per 40 large tubers cut and examined.

³Chip color indices -- lower indices indicate lighter color: 1-7 acceptable; >7 unacceptable;
Waller Duncan LSD (K=100) for chip color = 0.5.

Maine Table 9. French fry color and texture of selected potato clones and varieties under simulated processing conditions. All varieties were grown at Presque Isle, Maine during 1988.

Variety	Color Grade ² Rating Index	Grayness ³ Index	Grayness ³ Index	Mealiness ⁴ Index	Comments ⁵	Overall Texture Rating ⁶
Russet Burbank (std)	00	2.25	3.00	4.19		0
BelRus	00	2.14	4.00	3.24		-
Coastal Russet	0-1	3.18	4.00	3.92		0
HiLite	0	2.80	3.72	3.99		0
A7411-2	00	2.25	1.75	4.00		0
A74114-4	00-0	2.50	3.75	3.64		0
AF465-2	00	2.25	3.75	3.22		-
AF522-5	0-1	3.40	3.61	4.05		0
B0045-6	00-0	2.52	3.25	4.26		0
B0220-14	00	2.00	4.00	4.81		0
B9922-11	00-0	2.50	3.96	3.88		
Waller Duncan LSD (=100)	0.70	0.52	0.64			

Two center raw tuber slices were cut from each of ten tubers. The slices were rinsed in cool water, blanched for 8 min at 170° F, par fried at 375° F for 80s, and quick frozen at -30°C in plastic bags. Four such replications were processed and held at -15°C until evaluation. Prior to evaluation, samples were finish fried at 360° F for 2-1/2 min., blotted dry with a paper towel, and cooled 6 min. All samples were processed and evaluated by the Department of Food Science (R. True and T. Work), University of Maine; Orono, ME. Processing was conducted on December 12. All tuber samples were stored at 50°F, 85% R.H. from harvest until processing.

²Color Grades are from U.S.D.A. color standards chart #65-1, third edition.

³Grayness indices represent weighted means derived from the following evaluation scale: 4=no graying; 3=moderate graying; 2=intense graying.

⁴Mealiness indices represent weighted means derived from the following evaluation scale: 5=dry, mealy; 4=mod. mealy, slightly moist; 3=slightly mealy, mod. moist; 2=soggy, not mealy; 1=very soggy, not mealy.

⁵Comments: Ir-french fries were irregular in color; dark blotches detracted from appearance of product.
U=french fries were very uniform in color

Gr=exceptionally gray color, very unattractive

⁶Overall texture rating: +, o, - texture rated better, not different, poorer than Russet Burbank, significantly.

Maine Table 10. Chip color from 38° F and 50° F storage, reconditioning potential, after cooking darkening indices, washed appearance ratings, days to sprout formation, and storage weight losses at 38° F and 50° F for 38 potato varieties grown at Presque Isle, Maine during 1988 and stored during the 1988-1989 storage season.

Variety	Processing from Storage		After Cooking	Darkening ³	Appearance Index ⁴	Days to Sprout PIP	Indicated Length 1/2 inch	Storage Wt. Loss %
	50° F	38° F						
Allegany	5.9	9.3	8.4	6.9	65 (8) BS, B, SZ	159	222	4.1 7.6
Atlantic	6.1	9.6	7.2	7.8	38 (6) SS, B	117	159	5.7 16.7
BelRus	6.2	9.3	7.8	7.2	79 (8)	123	179	5.0 17.1
Coastal Russet	8.8	10.0	9.4	8.2	39 (6) NR, SS, B	116	228	3.7 13.6
Hilite	7.9	10.0	9.5	7.2	39 (6) M, B	151	214	3.2 6.7
Kanona	3.2	8.3	5.9	7.0	40 (7) SB, SS	145	201	4.4 13.2
Katahdin	6.8	9.8	7.9	6.9	38 (7) SS, B	117	180	3.5 14.0
Kennebec	5.6	9.7	8.4	7.9	5 (4) RS, SS, B	124	173	6.1 9.8
LaRouge	8.3	10.0	9.5	7.2	33 (6) SS, B	131	180	6.4 15.5
Norchip	6.5	10.0	7.8	7.4	17 (2) M, PC, SS	89	159	6.1 17.3
Ontario	7.5	10.0	9.0	6.8	19 (3) M, GC, RS, SS, ST	68	96	4.8 12.3
Russet Burbank	7.3	9.7	8.7	6.8	27 (3) M, NR, B	172	228	4.1 8.4
Sangre	9.4	10.0	9.5	8.3	68 (8) SS, B	124	180	5.1 7.2
Steuben	3.5	9.5	8.3	6.9	17 (3) RS, B	117	201	6.0 11.5
Superior	7.3	10.0	7.4	7.2	23 (5) M, PC, SS, B	89	131	5.1 11.1
A7411-2	7.7	9.3	7.4	7.0	41 (5) M, GC, B	109	172	4.2 13.6
A74114-4	7.9	10.0	9.3	7.6	19 (3) SB, SS, BS, B	144	207	4.6 10.1
AF465-2	6.7	9.3	8.4	6.7	23 (5) M, NR, SB, BS, B	116	172	5.4 15.0
AF474-2	8.5	10.0	8.8	6.6	29 (4) SS, BS, B	103	152	6.6 21.2
AF522-5	8.1	10.0	9.5	7.0	43 (6) SS, B	130	186	4.0 14.1
AF875-16	2.9	9.0	4.0	7.0	19 (2) PC, SS, SZ, BS, B	89	152	6.0 24.6
B0045-6	5.9	9.3	7.4	7.5	54 (7) NR, B	109	151	4.4 13.6
B0220-14	4.0	8.2	5.6	7.2	32 (4) M, NR, SB, BS, B	109	179	4.2 15.2
B0172-15	2.6	9.3	8.0	7.0 ^a	31 (6) RS, SS, B	110	152	6.6 12.0

Maine Table 10 - Continued

Variety	Processing from Storage									
	50° F	38° F	Chip Color ¹	Chip Color ¹	Cooking Recond. ²	Darkening ³	Washed Appearance Index ⁴	Sprout PIP	Days to Indicated Length 1/2 inch	Storage Wt. Loss % 38°F 50°F
B0240-11	2.8	8.9	7.0	7.2	21 (2)SB, SS, BS	124	187	3.9	12.5	
B0242-2	3.6	9.0	7.2	7.2	27 (4)RS, SS	75	117	4.6	17.2	
B0243-18	2.9	8.3	6.5	7.2	11 (4)PC, SB, SS, BS	89	138	4.3	17.9	
B9792-8B	3.7	9.0	7.7	7.2	41 (6)SB, RS, SS, B	75	131	4.5	14.6	
B9792-61	3.9	9.3	5.1	7.2	8 (3)PC, SS, BS, B	82	124	5.5	24.0	
B9792-157	4.6	9.2	6.3	7.7	41 (5)RS, SS, B	117	166	5.3	18.2	
B9792-158	4.4	8.4	5.2	6.7 ^a	45 (7)M, SS	103	131	4.5	17.2	
B9922-11	5.4	9.9	8.1	7.3	56 (7)B	137	193	3.1	9.2	
CS7635-4	5.2	8.9	6.8	7.0	33 (6)SS, BS, B	138	208	6.7	8.1	
CS7639-1	9.1	10.0	9.9	8.4	14 (3)M, GC, RS, SS	96	152	4.5	14.1	
CS7697-24	9.0	10.0	9.5	8.0	15 (3)M, SS, B	96	145	5.7	22.1	
NY79	4.5	9.1	8.1	7.6	8 (4)PC, RS, SS, BS, B	110	215	5.5	10.0	
WNC521-12	6.9	9.3	6.6	6.9 ^a	43 (5)RS, SS, B	110	145	4.3	12.4	
WNC672-2	6.2	9.0	7.9	7.0	20 (4)RS, SS, B	75	138	5.0	10.6	

¹ Stored at 38°F or 50°F, 85% R.H. from harvest until mid February. Chip colors: 1-7 acceptable, >7 unacceptable.

² Reconditioned samples were placed at 70°F for a 3 wk period starting on January 22, 1988. Chip color rating scale: 1-7 acceptable, >7 unacceptable.

³ Samples were stored at 45°F, 85% R.H. from harvest until January 19, 1989 and were then warmed to 65°F for 96 h. Diced tubers were blanched for 5 min., cooled to 120°F, then rated after 30 min with a Munsell Neutral Color Scale. Higher indices indicate lighter color. ^aTubers fell apart during cooking.

⁴ Unrelicated samples weighing approximately 7500 grams were stored at 45°F and 85% R.H. until mid-January. Tubers were then washed and graded. First number indicates & bright, attractive and uniform tubers in sample. Numbers in parentheses indicate subjective appearance of the sample using standard NE-107 appearance code. Codes indicate major external defects as follows: m=missapen, NR=nonuniform russetting, PC=poor color, SB=sunburn, GC=growth cracks, CS=silver scurf, RS=russet scab, DR=dry rot, SR=soft rot, BS=black scurf, ST=stolons adhere to tubers, LE=enlarged lenticles, B=bruises, BH=buttonhole, PS=pitted scab, SZ=small tuber size, SC=skin cracks.

⁵ Tubers were stored at 45°F, 85% R.H.

⁶ Percentage sprout and weight loss following storage from harvest until April 8, 1989, at indicated temperature and 85% R.H.

MAINE -- 1989

Alvin F. Reeves, Robert B. Long, Garland S. Grounds,
R. Alan Henn, and Arnold A. Davis.

Potato Breeding

Seed and seedling production. Having made excellent progress toward the development of new chipping varieties, we have devoted our efforts during this past year to two additional areas: the development of a long russet processing variety and the development of scab-resistant round white table varieties. A total of 30 parent plants were intercrossed in 54 different combinations to produce 102,975 seeds. An additional 525,250 seeds were obtained from 26 field plantings. Greenhouse plantings of true seeds yielded 42,429 seedlings from which 33,140 tubers were harvested.

Seedling selection. A total of 302 (0.57%) new selections were saved from 52,955 single hills. From the 624 12-hill plots, 142 (22.8%) were saved for further testing. Sixty-four 60-hill plots, and 39 advanced selections were maintained and tested.

Protoclonal selections. Field testing of 31 clones derived from Russet Burbank leaf cells included replicated yield tests of eight of the advanced protoclones. Seven were equal to the standard Russet Burbank in yield, and six were equal in specific gravity.

Disease tests. In cooperation with Drs. Franklin Manzer, Richard Storch, Bill Brodie, Robert Goth, Gilbert Banville and Simeon Leach, a number of selections were tested for resistance to several diseases. All tests were inoculated either directly or on spreader rows within the plots. Results were as follows: two of 60 selections tested were resistant to late blight; 31/85 to acid scab; 65/81 to common scab; 70/81 to net necrosis; 3/21 to leafroll; 11/78 to Verticillium; 15/62 to golden nematode; 2/25 to Fusarium roseum; 2/25 to Fusarium solani; and 1/4 to ring rot.

Physiological disorders. Additional tests for physiological disorders showed 35 of 82 resistant to hollow heart; 16/33 to blackspot bruising; and 26/57 to shatter bruising.

Yield tests. A total of 47 selections were grown in replicated yield tests in 1989. Eight yielded better than the control varieties and 12 had higher specific gravities. Early maturing selections were given 120 pounds of nitrogen per acre and killed at 90 days from planting. Medium maturing selections were given 140 pounds of nitrogen and killed at 99 days; medium-late maturing selections were given 160 pounds of nitrogen and killed at 109 days; late maturing selections were given 160 pounds of nitrogen and killed at 119 days.

Chip tests. After processing in December, February, and April from four different storage temperatures, four selections had better average chip color than Monona: CS 7232-4, AF 875-16, ND 860-2, and Somerset.

Processing and Cooking tests. Terry Work (Food Sciences Department of the University of Maine, Orono) conducted french fry tests of ten selections, and cooked quality tests for ten additional selections. Three selections were better than Katahdin in three or four of the six qualities measured, and three other selections were rated poorer than Katahdin in only one of the six qualities.

Grower trials of advanced selections. Three unnamed selections were grown on commercial farms in 1989: AF 465-2, CS 7635-4, and CS 7697-24. Results were promising for the two round whites, seed increases are planned for 1990.

Russets: AF 465-2 had good tuber type, yield, and appearance; however, hollow heart was noted in tubers over nine ounces.

Chipping selections: Somerset, CS 7232-4, and AF 875-16 are in demand as cold storage chipping selections.

Round white table varieties: CS 7697-24 gives high yields at early harvest, with good size and type. CS 7635-4 yielded well at late harvest with round, uniform tubers, but had considerable (5%) air cracking.

Maine Table 1 summarizes the advanced selections in the Maine potato breeding program.

Maine Table 1. Characteristics of some advanced selections from the Maine potato breeding program.

Pedigree	Maturity	Tuber type	Skin color	Cooked quality	Chip color	Percent dry matter	Storage qualities	Hollow Heart	Virus X	Leafroll	Net necroses	Late blight	Early blight	Common scab	Verticillium	Golden nematode
<u>Round white tablestock</u>																
AF1203-5	Early Maturing	ME	CN	R	A	G	F	E	F	F	R	S	S	M	R	R
AF1219-1	ME	CN	R	A	A	M	F	G	F	F	R	R	M	S	S	S
AF1327-1	E	WN	R	A	F	U	F	E	F	F	S	S	M	R	S	S
AF1331-2	M	W	RO, f1	E	F	U	A	G	F	F	R	S	S	M	S	S
AF1333-1	E	W	RO	G	F	U	M	M	F	F	R	S	S	R	S	R
CS7697-24	E	W(C)	R(Q)	G	G	M	G	A	G	F	R	S	S	M	S	S
<u>Mid Season</u>																
AF828-5	ML	W	RO	G	G	M	F	E	E	S	R	S	S	R	S	R
AF1060-2	L	W	R	E	A	U	F	M	M	S	R	S	S	R	S	S
AF1302-1	M	W!	R	G	F	U	F	E	F	R	M	S	M	R	S	S
<u>Full Season</u>																
AF756-5	L	W	RO, f1	E	G	U	A	E	F	S	R	M	M	R	S	S
AK3-79-209-81	ML	W	OR	G	A	U	A	F	F	R	M	M	M	R	S	S
AK3-79-235-81	M	W	O(L)	A	G	U	A	F	F	S	R	S	M	S	R	S
AK5-76-168-79	L	WN	R, f1	A	M	M	G	F	F	R	M	M	M	S	S	S
CS6335-4	L	W	RO	G	M	G	G	M	M	R	S	R	M	F	R	S
<u>Long russets for processing or count box</u>																
AF465-2	ME	R	OL, f1	M	A	M	E	A	F	A	S	S	R	S	M	S
AF522-5	ME	R	O(L)	M	G	U	M	F	F	F	S	R	S	M	R	S
AF1166-4	ME	R	O	G	F	M	F	U	F	F	S	F	S	S	R	S
AF1285-1	ME	LR	O	G	F	U	M	F	F	F	R	S	M	M	S	R
AF1337-2	ME	BN	O	G	F	U	M	F	F	F	R	S	F	S	S	S
AF1338-1	E	R	L	M	F	M	F	N	F	F	F	R	S	F	S	S

Maine Table 1. Continued

Pedigree	Resistance to 5/	Chipping type	Skin color 2/	Tuber type 3/	Maturity 1/	Cooked quality 4/	Chip color 4/	Percent dry matter 4/	Storage qualities 4/	Bruising 4/	Hollow Heart 4/	Virus X	Leafroll	Net necroses	Late blight	Early blight	Acid scab	Common scab	Verticillium	Golden nematode
Somerset	ME	WC	OL	A	E	G	A	A	A	F	G	S	S	R	R	S	S	S	S	S
AF845-11	M	B	R	C	G	G	F	A	G	F	E	S	S	R	S	M	M	S	S	S
AF875-15	ME	C	R	A	G	G	F	G	G	F	S	M	S	R	S	R	S	M	S	S
AF875-16	ML	W	R	G	G	E	F	G	G	F	S	M	S	R	S	R	S	R	S	S
AF875-17	ML	W	R	A	A	G	F	M	G	F	E	R	S	R	S	R	S	M	R	R
AF879-3	M	W	R	A	F	G	E	G	E	F	S	R	S	R	S	R	S	M	S	S
CS7232-4	E	WC	R	M	G	E	E	E	G	E	E	S	S	R	S	M	S	M	S	S

1/ E = early, M = medium, L = late.

2/ W = white, C = cream, B = buff, R = russet, N = netted, L = light.

3/ R = round, O = oblong, L = long, f1 = flat.

4/ Rated as U = unacceptable, M = marginal, A = acceptable,
G = good, E = excellent, F = further testing needed.5/ R = resistant, M = moderately resistant, S = susceptible,
F = further testing needed.

MICHIGAN

R.W. Chase, G.H. Silva, D.S. Douches, R.B. Kitchen and
R. Hammerschmidt

I. 1989 POTATO VARIETY EVALUATIONS

Round whites and russets were harvested at two dates to evaluate their marketable and physiological maturity. Varieties selected for their exceptional qualities were then subjected to more intensive tests to determine their strengths and weaknesses. Management profiles were established with some selected varieties that optimized production inputs for improved quality and marketability.

Special emphasis was given to tuber quality parameters of all new varieties. The focus was on overall appearance, external and internal defects, specific gravity, chip color, storability and culinary properties. Of significant interest to Michigan is resistance to common scab and bruising. For chip color and storability studies, potential chipping varieties were stored at two temperatures (45° and 52°F). Blackspot bruising was evaluated with tubers stored at 40°F.

DATES OF HARVEST TRIAL FOR ROUND VARIETIES

Eight named and four advanced selections were tested at two harvest dates (98 and 138 days). Onaway, Atlantic and Norchip were included as check varieties. Four replications of a randomized complete block design were harvested at each harvest date. Plots were 23 ft. x 34 inches and plants were spaced 12 inches. The trials were planted in the first week of May. Trials were located at the Montcalm Research Farm in Entrican.

The previous crop was dry beans plowdown in fall 1988 and rye plowdown in spring 1989. Basal fertilizer and aldicarb (Temik 15G) were applied as described in the previous chapter. The hillling and herbicide application was completed by May 25. The crop was irrigated 10 times based on Michigan State University potato irrigation schedule. The amount of water applied ranged from 0.5 to 1.0 inch per irrigation, totalling to 7 inches for the season. An early and late blight forecasting program from Wisconsin was used as a guide to commence fungicide spraying. Relative humidity and temperature at canopy levels were monitored for this purpose. Fungicide spraying started on June 28 and sprayed every 7-10 day intervals. Fungicides Dithane M45 and Bravo 720 were alternated for early blight control. Weather data at the Montcalm Research Farm was collected using a Campbell's CR10 micrologger.

In the culinary tests, chip color was measured for chips made from 20 tubers. A single slice was taken from each tuber. Frying temperature was 350-360°F. An Agtron E-10 colorimeter was used for color measurements. Chip defects such as stem end and vascular discolorations, off colors and bruises were also

noted. Samples were stored at 45° and 50°F for chipping out of storage. For after cooking darkening, peeled halves of three tubers were steam cooked and evaluated at 0 and 1 hour after cooking.

Blackspot bruising was evaluated for both check and artificially bruised potatoes. Artificial bruising was carried out by taking samples out of 40°F storage. Twenty tubers were placed in a wooden drum and manually turned 10 revolutions at a moderate speed. These tubers were kept for 48 hours at room temperature prior to peeling. In the check treatments, no artificial bruising was done, so any blackspot observed occurred during harvest and handling. A Hobart peeler was used for peeling the tubers. Both the number of tubers with blackspot and the number of blackspots per tuber were recorded for each sample.

Results

The data for the round varieties at the late harvest date are presented in Table 1. At 98 days, Onaway and Eramosa were the earliest in maturity. Eramosa matured in about 80 days and produced smooth oblong tubers with good general appearance. Although it produced only average yields, Eramosa has potential for early tablestock market.

Most of the medium to medium-late maturing varieties performed well in 1989. Kanona, Spartan Pearl, Somerset, Snowden, Saginaw Gold and AF875-16 produced a high percent of U.S. No. 1 tubers, minimal internal defects and excellent chip color. The tuber yield was above average in Kanona and Spartan Pearl. MS716-15 and AF875-16 had higher specific gravities than Atlantic. Kanona, Spartan Pearl and Saginaw Gold had lower specific gravities compared to Atlantic. Snowden appears to have an excellent potential for chip processing in Michigan. Somerset has slightly lower solids compared to Snowden and the tubers are cylindrical in shape. It also has a good potential in Michigan for processing and fresh market.

Among the late maturing varieties, Steuben, Allegany, MS700-70 and Norwis (FL657) produced very high yields and excellent chip color. There was a high percent of oversized tubers in Steuben and Allegany. MS700-70 had higher solids than Steuben and Allegany. Norwis (FL657) had excellent chip color but its specific gravity was lower than desired for processing. MS716-15 produced average yields but its specific gravity and chip color were excellent.

In the boiling tests (Table 6), undesirable levels of after cooking darkening were observed in Steuben, Allegany and Spartan Pearl. Some sloughing was observed in Kanona, MS716-15, W855 and Atlantic. MS700-70 and Norwis (FL657) had excellent flesh appearance after cooking.

In the blackspot evaluations (Table 6), varieties that showed greater than 25% blackspot in the check treatments were Allegany, Kanona, Atlantic and AF875-16. Most varieties showed a higher incidence of blackspot when they were artificially bruised. Varieties with greater than 75% blackspot were Allegany, Kanona, W855, Atlantic and AF875-16. The drier than normal soil conditions during the 1989 harvest may have contributed to the increased incidence of blackspot compared to previous years.

DATES OF HARVEST
TRIAL FOR RUSSET
AND LONG VARIETIES

Fourteen varieties were tested for the count-pack and processing potential at two harvest dates, 112 and 142 days (Table 2). The production practices used in this trial were similar to those described for the round varieties. Russet Burbank was used as the check variety. Poor sizing was a general problem in this trial and is due in part to heavy rains in early June and early August which apparently depleted the available nitrogen for sizing.

Early to medium maturing varieties were Russet Norkotah, HiLite Russet, ND671-4R and Cal-Ore. They were characterized by lower specific gravities compared to Russet Burbank. All four varieties had smooth external appearance. ND671-4R and Cal-Ore performed poorly in tuber yield with poor sizing. Based on external appearance and freedom from internal defects, Russet Norkotah and HiLite Russet had excellent potential for the count-pack market.

Most of the other varieties in the trial were late to very late maturing. Those with high gravity and potential for processing were A7411-2, Frontier Russet (A74114-4) and A78242-5. A78242-5 is a blocky russet and although the solids were not very high, its shape and appearance were ideal for the french fry market. B7592-1 is a medium-long white with high yields, but the tuber shape appeared to be variable from oblong to long. It had good solids and minimal internal defects. A76147-2 produced high yields with medium gravity and its use may only be for fresh market. A79341-3 and A79357-17 were deleted from future tests due to their susceptibility to hollow heart. MN10874 is a russet with a smooth external appearance and minimal internal defects. It requires further testing. Russet Nugget was very late maturing and produced a very low yield. It had high solids, but was susceptible to hollow heart, blackspot and after cooking darkening.

In artificially bruised tests (Table 6), varieties having greater than 75% blackspot were B7592-1, A76147-2, A74114-4, A7411-2, Russet Nugget and Russet Burbank. A74114-4, A7411-2 and Russet Nugget showed some sloughing after boiling. Varieties with good to excellent appearance after cooking were A79341-3, B7592-1, A76147-2, A78242-5, Russet Burbank, ND671-4R and Cal-Ore.

RED SKINNED VARIETY
TRIAL

Red skinned varieties have generated an ongoing interest among Michigan growers. The emphasis was on fresh market potential with uniform size, shape and color retention during storage. In 1989, 11 varieties were tested in a randomized block design with four replications. The trial was harvested after 118 days (Table 3).

The varieties that performed well and showed the best appearance and color at harvest were ND2224-5R, NDT9-1068-11R and Dark Red Norland. NDT9-1068-11R had the highest tuber yield but its use appears to be limited because of susceptibility to skinning, air checks and soft rot during storage. W949-R, W948-R and Red LaSoda showed severe skinning during harvest. Dark Red Norland and Norland were very similar in growth and maturity but the skin color was darker in Dark Red Norland. All varieties, except Reddale, had minimal internal defects. Reddale was susceptible to hollow heart. There was a high percent of undersized tubers in Red Gold.

In cooking tests (Table 6), varieties that showed after cooking darkening were Reddale, W949-R, ND2224-5R and Red Gold.

MSU SEEDLING TRIAL

Six new MSU lines were tested at two harvest dates, 96 and 130 days. At each harvest date, four replications of a randomized complete block design were harvested. The lines included four from the 401 series (Atlantic x Yukon Gold) and two from the 402 series (Atlantic and Onaway). Three lines from the 401 series (401-1, 401-2 and 401-8) were yellow fleshed. The results are summarized in Table 4. Cultivars Onaway, Atlantic, Michigold and Yukon Gold were included as checks.

Varieties having excellent potential for chip processing with high specific gravity and Agtron chip color were MS401-2, MS401-7 and MS401-1. These varieties have performed consistently well at Montcalm during four years of testing. The two varieties tested for the fresh market, 402-7 and 402-8, had smooth external appearance and a high percent of U.S. No. 1 tubers. Onaway had the highest yield with minimal internal defects. Atlantic was susceptible to hollow heart. Michigold produced a high percent of undersized tubers. Yukon Gold produced below average tuber yield. MS401-8 will be dropped because of susceptibility to internal brown spot.

All MSU lines showed no after cooking darkening but MS401-2 and MS401-7 showed some sloughing (Table 6).

ADVANCED ADAPTATION
TRIAL

Entries into this trial consisted of advanced lines released from other states with potential for chipping in Michigan. Nine varieties were tested in a randomized complete block with four replications at one harvest date. Three cultivars, Onaway, Atlantic and Norchip, were included as checks.

The results are summarized in Table 5. Trent had high yields and specific gravity. The varieties having excellent Agtron chip color were Trent, B9792-157, B9792-158, Conestoga, CS7232-4 and B9792-61. Trent and B9792-157 were susceptible to hollow heart. CS7232-4 is reported to have an ability to chip out of cold storage. However, its below average yields and gravity are limitations.

In post harvest evaluations, all varieties except Trent, had moderate resistance to blackspot (Table 6). In boiling tests, only B9792-158 had an undesirable level of after cooking darkening. Some of the promising varieties from this trial will be tested more intensively in 1990, depending on the availability of seed.

Michigan Table 1. Second Date of Harvest Yield Data — Round White Varieties — September 18, 1989 (138 days).

Variety	Yield (cwt/a)			Percent Size Distribution						Agtron				Defects*			
	U.S. No. 1 Total			U.S. No. 1 <2" 2-3½" >3½"			Pick Outs			Spec.	Chip	Grav.	Color	Maturity	IBS/ HH	VD	Cut
Steuben	579	601	95	4	60	35	0	1.077	65	4.5	6	9	0/40				
Allegany	512	540	95	4	70	25	1	1.078	67	5.0	1	1	0/40				
Kanona	485	518	94	5	86	8	0	1.076	69	3.5	1	4	0/33				
MS700-70	483	529	91	7	79	12	1	1.083	60	5.0	3	2	7/37				
Norwis (FL657)	470	522	90	4	82	8	6	1.065	71	4.0	0	0	2/38				
Onaway	466	518	89	6	75	14	4	1.064	27	2.5	0	2	0/32				
Spartan Pearl	439	513	86	12	82	4	2	1.075	63	4.0	1	3	1/16				
MS716-15	419	474	88	11	82	6	0	1.088	66	5.0	0	0	0/11				
Somerset	407	469	87	12	73	14	2	1.079	68	4.0	3	3	1/38				
Snowden (W855)	385	464	84	15	81	3	1	1.084	76	4.0	1	3	0/9				
Atlantic	379	434	87	7	69	18	5	1.085	70	4.0	7	11	9/38				
Saginaw Gold	370	428	86	11	83	3	3	1.076	73	3.0	0	3	0/14				
AF875-16	325	370	88	10	85	3	2	1.088	71	3.5	0	0	1/13				
Eramosa	324	383	85	13	84	1	2	1.062	35	1.5	0	2	0/5				
Norchip	262	359	73	15	71	2	12	1.073	61	3.5	0	3	0/7				
AVERAGE	420	475	88					1.077									

*Internal defects per number of oversized (>3½") tubers cut.

Maturity: 1 = early; 5 = late maturity.

Planting Date: May 2, 1989.

Harvest Date: September 18, 1989.

Observations: Eramosa had smooth skin at harvest. MS700-83 and Somerset had some shatter bruise. Somerset, Allegany and Steuben showed some greening. Allegany had some stolons still attached to tubers after harvest.

Michigan Table 2. Second Date of Harvest Data — Count Pack Varieties — Montcalm Research Farm — 1989 (142 days).

Variety	Yield (cwt/a)			Percent Size Distribution					Specific Gravity	Maturity	Defects*		
	U.S. No.	1	Total	U.S. No.	<4 oz.	4-10 oz.	>10 oz.	Pick Outs			HH	VD	IBS/ cut
A79341-3	501	594	84	12	70	14	4		1.083	4.5	26	0	0/40
B7592-1	482	608	80	14	61	19	7		1.078	4.0	0	2	0/40
A76147-2	478	597	81	15	69	12	4		1.075	5.0	7	0	0/39
A79357-17	416	562	75	18	57	18	7		1.081	5.0	20	0	0/40
A78242-5	332	477	70	26	60	10	3		1.075	4.5	3	0	0/31
Frontier Russet	313	446	70	19	56	14	10		1.088	4.5	6	0	0/36
A7411-2	304	428	71	24	61	10	5		1.090	4.5	2	0	0/33
MN10874	265	404	65	30	63	2	5		1.074	4.0	0	0	0/9
Russet Norkotah	264	377	70	36	61	9	3		1.068	3.0	1	1	0/21
Russet Burbank	221	420	53	35	49	4	12		1.080	5.0	5	0	0/16
HiLite Russet	198	339	58	38	55	3	4		1.064	3.5	1	0	0/10
ND671-4R	180	390	47	52	45	2	1		1.063	3.5	0	0	0/3
Russet Nugget	122	260	48	51	46	2	1		1.089	5.0	2	0	0/4
Cal-Ore	93	239	39	59	39	0	2		1.071	3.5	—	—	—
AVERAGE	298	438	68						1.077				

*Internal defects per number of oversized (>10 oz.) tubers cut.

Maturity: 1 = early; 5 = late maturity.

Planting Date: May 2, 1989.

Harvest Date: September 22, 1989.

Observations: Russet Norkotah and ND671-4R had some pink eye at harvest. A79341-3 and A79357-17 had severe hollow heart. B7592-1 had variable tuber shape.

Michigan Table 3. Yield of Red Potato Varieties — 1989 — Montcalm Research Farm
— August 29, 1989 (118 days).

Variety	Yield (cwt/a)			Percent Size Distribution					Maturity	Specific Gravity	Defects*		
	U.S. No. 1	U.S. Total	No. 1	<4 oz.	4-12 oz.	>12 oz.	Pick Outs	IBS/ HH	VD cut		IBS/ HH	VD cut	
NDT9-1068-11R	598	634	93	5	68	25	2	4.5	1.060	0	0	0/40	
Viking	570	640	89	6	74	15	5	4.0	1.066	0	0	0/40	
Red LaSoda	475	537	88	9	80	8	3	4.5	1.057	3	0	0/34	
Reddale	467	503	93	5	66	27	2	4.5	1.056	8	0	0/40	
Sangre	457	504	91	8	77	14	1	4.0	1.060	3	0	0/37	
W948-R	452	518	87	13	80	7	0	5.0	1.072	0	3	0/31	
W949-R	402	440	91	8	81	10	1	5.0	1.063	0	1	0/33	
ND2224-5R	372	452	82	19	79	3	0	3.5	1.056	0	2	0/8	
Norland	341	420	82	18	81	1	0	3.0	1.063	1	0	0/2	
D. Red Norland	306	377	80	20	80	0	1	3.0	1.062	-	-	-	
Red Gold	283	419	68	32	67	1	0	3.5	1.070	0	0	0/2	
AVERAGE	429	495	86						1.063				

*Internal defects per number of oversized (3½") tubers cut.

Observations: ND2224-5R, NDT9-1068-11R and Dark Red Norland had good skin color and appearance. W949-R is a late variety and shape not uniform. W948-R has deep eyes and susceptible to skinning. Red LaSoda is susceptible to skinning.

Michigan Table 4. Second Date of Harvest — MSU Lines — 1989 — Montcalm Research Farm (130 days).

Variety	Yield (cwt/a)			Percent Size Distribution					Agtron	Defects*			
	U.S. No.	1	Total	U.S. No.	1	<2"	2-3½"	>3½"		Specific Gravity	Chip Color	HH	VD
Onaway	466	551		85	8	80	5	7	1.065	27	0	0	0/19
MS401-2	411	440		93	6	88	5	1	1.085	64	0	0	2/19
MS401-7	392	449		87	8	87	0	5	1.087	66	-	-	-
Atlantic	386	438		88	8	78	10	4	1.088	65	9	0	4/29
MS402-7	342	380		90	6	77	13	4	1.070	-	4	0	1/28
Michigold	333	421		79	21	78	1	0	1.083	58	1	0	0/4
MS401-8	328	370		89	8	79	10	3	1.081	59	3	0	7/20
MS402-8	326	347		94	5	79	15	1	1.068	-	3	0	0/30
MS401-1	315	398		79	19	77	2	2	1.081	69	4	0	0/6
Yukon Gold	295	335		88	9	85	3	3	1.077	49	3	0	0/7
AVERAGE	359	413		87					1.079				

*Internal defects per number of oversized (>3½") tubers cut.

Michigan Table 5. Yield of Potential Chipping Varieties in the Advanced Adaptation Trial — Montcalm Research Farm (128 days).

Variety	Yield (cwt/a)			Percent Size Distribution					Agtron	Defects*			
	U.S. No.	1	Total	U.S. No.	1	<2"	2-3½"	>3½"	Pick Outs	Specific Gravity	Chip Color	HH	VD
Onaway	503	580	87	5	75	12	8	1.060	27	0	0	2/33	
Trent	463	507	91	4	79	12	5	1.091	63	13	0	4/39	
ND1859-34	449	499	90	10	82	8	0	1.077	56	3	0	1/15	
F72004	435	471	92	6	83	9	2	1.075	50	0	0	0/32	
B9792-157	417	468	89	9	80	9	2	1.073	65	10	0	2/30	
Atlantic	392	441	89	27	74	15	4	1.083	67	11	0	6/36	
B9792-158	359	432	83	13	81	2	4	1.079	61	2	0	0/11	
Conestoga	346	407	85	12	81	4	3	1.074	60	2	0	0/15	
AF330-1	330	380	87	11	82	5	2	1.077	-	1	0	0/13	
Norchip	326	453	72	23	72	0	5	1.074	60	0	0	0/4	
CS7232-4	315	349	90	9	87	3	1	1.072	68	2	0	0/9	
B9792-61	312	363	86	12	83	3	2	1.077	63	2	0	0/14	
AVERAGE	387	446	87					1.076					

*Internal defects per number of oversized (>3½") tubers cut.

Michigan Table 6. Post Harvest Quality Evaluations of Potato Varieties Tested in 1989.

Variety	Percent Blackspot		After Cooking Darkening		Remarks
	Check	Bruised	0	1 Hour	
<u>Round Varieties - Dates-of-Harvest</u>					
Steuben	20	60	2	2.5	all 3 dark ends
Allegany	30	100	1	2	all 3 have slightly dark ends
Kanona	35	95	1	1	some sloughing
MS700-70	10	60	1	1	excellent appearance
Norwis (FL657)	10	25	1	1	excellent appearance
Onaway	0	25	1	1.5	
Spartan Pearl (MS700-83)	0	45	1	2	all 3 dark ends but not severe
MS716-15	10	35	1	1	some sloughing
Somerset	10	70	1.5	1.5	1 dark end
Snowden (W855)	15	95	1	1	some sloughing
Atlantic	30	75	1	1	some sloughing
Saginaw Gold	10	40	1	1.5	1 slightly dark
AF875-16	40	85	1	1.5	
Eramosa	10	35	1	1.5	2 slightly dark
Norchip	15	35			
<u>Advanced Adaptation</u>					
Onaway	0	25	1	1.5	
Trent	20	75	1	1	all 3 sloughed
ND1859-34	10	25	1	1.5	yellow flesh but slightly dark
F12004	5	15	1	1.5	
Coastal Chip (B9792-157)	5	20	1	1	good
Atlantic	15	40	1	1.5	
B9792-158	10	50	1.5	2	all 3 slightly dark
Conestoga	0	15	1	1.5	
AF330-1	0	10	1	1	
Norchip	0	25	1	1	
CS7232-1	0	20	1	1.5	1 slightly dark
B9792-61	0	15	1	1.5	1 slightly dark
<u>MSU Lines</u>					
Onaway	10	45	1	2	all 3 discolored
MS401-2	0	35	1	1	some sloughing
MS401-7	10	70	1	1	excellent appearance, some sloughed
Atlantic	5	55	1	1	some sloughing
MS402-7	5	70	1	1	
Michigold	10	40	1	1.5	deep eyes for peeling
MS401-8	-	-	-	-	
MS402-8	0	45	1	1.5	
MS401-1	0	15	1	1.5	all 3 mildly discolored
Yukon Gold	10	40	1	1	

Michigan Table 6. (continued)

Variety	Percent Blackspot		After Cooking Darkening			Remarks
	Check	Bruised	0	1 Hour		
<u>North Central</u>						
MN13420	0	30	-	-		
MN13451	20	55	-	-		
MN13545	0	10	1	1		excellent
NEA219.70-3	15	60	-	-		
NEA22.75-1	0	45	1	1.5		
<u>Long Types</u>						
A79341-3	5	30	1	1		excellent appearance
B7592-1	25	85	1	1		good
A76147-2	35	85	1	1		excellent appearance
A79357-17	5	70	1	1		
A78242-5	15	45	1	1		good
<u>Frontier Russet</u>						
(A74114-4)	20	100	1	1		some sloughing
A7411-2	20	85	1	2		severe sloughing
MN10874	25	75	1	2		2 dark ends
Russet Norkotah	15	35	1	2		2 dark ends
Russet Burbank	10	40	1	1		excellent
Hilite Russet	0	55	1	1.5		
ND671-4R	0	25	1	1.5		good
Russet Nugget	20	95	1	2		2 dark ends, some sloughing
Cal-Ore	5	15	1	1.5		good
ND1538-1Russ	0	30	1	1.5		
W1005	25	60	1.5	2		all 3 slightly dark
Norgold Russet	0	55	-	-		
<u>Reds</u>						
NDT1068-11R	0	45	1	1.5		1 dark
Viking	10	45	1	1.5		good
Red LaScda	0	10	1	1.5		deep eyes, difficult to peel
Reddale	5	45	1.5	3		3 dark ends
Sangre	0	20	1	1.5		good
W948-R	15	80	1	1		good
W949-R	0	30	1	2		2 dark ends
ND2224-5R	10	40	1.5	2		
Norland	0	0	1.5	1.5		
Dark Red Norland	5	5	1.5	1.5		good appearance
Red Gold	0	80	1	2		2 dark ends
ND1196-2R	0	30	-	-		
Red Pontiac	0	10	-	-		

II. MICHIGAN STATE
UNIVERSITY POTATO BREEDING PROGRAM David S. Douches, R.W. Chase, R. Hammerschmidt, G. Silva, J. Cash

Varietal Development In 1989, 20,000 single hills were evaluated at the Clarksville Horticultural Experiment Station (CHES). These plants represented 150 different crosses between advanced lines and/or varieties. Thirty-five of the crosses were between russet/long white types, 114 crosses were between round white/yellow flesh types, and 1 cross for red types. Visual selection for tuber set, internal quality, external appearance was made. Approximately 300 single hills (1.5% selection rate) were selected and advanced for further testing in 1990. In the subsequent years, advancement of these seedlings will be based upon scab resistance, specific gravity, cold chipping, storability, internal/external quality and yield.

Advanced Selections In 1989, 35 advanced selections from USDA Idaho (3), Maine (5), USDA Beltsville (12), Wisconsin (4), New York (1), Minnesota (7) and North Dakota (3) were grown and evaluated at the Montcalm Potato Research Farm. Each line was planted in two replications (23 hills/replication) except F100-1 and A80559-2 (1 replication each). Atlantic and Russet Norkotah were used as standards in the trial. The field was planted May 18 and harvested September 12 (127 days). The plots were mechanically harvested then graded for size distribution, internal defects, external defects, specific gravity. Table 1 summarizes the data from all the lines tested. Tables 2 and 3 list the best 10 lines for US#1 yield and specific gravity, respectively. In November, most of the round types were chipped and fried. This data are reported in Agtron values (model E-10) in Table 1. Additional tubers of these lines were placed in 45°F and 50°F long-term storage (120 days) for further evaluation.

These advanced selection were also placed in the replicated scab trial at the Soils Farm, East Lansing (see Potato Scab Research Report). Thirty tubers of each line were classified into 5 categories for percent scab coverage (0, 1, 5, 10, and 25%) and then averaged. Lines with less than 2% scab coverage were considered resistant in the trial.

Michigan Table 1. Advanced Selection Trial 1989.

<u>Clone</u>	<u>Total</u>	% <u>US#1</u>	% <u>A's</u>	% <u>3.25"</u>	% <u>2"</u>	P0	<u>HH</u> ²	<u>IBS</u> ²	<u>VD</u> ²	<u>SPGR</u> ³	<u>AGTRON</u>	% <u>Coverage</u>
A79141-3	327.7	63	63	0	35	01	6	0	0	1.080	-	2.2
AF465-2	269.6	45	45	0	54	00	0	0	0	1.071	-	3.0
AF845-11	348-1	88	81	06	07	04	1	1	7	1.067	-	7.3
AF875-15	363.4	88	87	01	09	01	0	0	1	1.080	63	11
AF875-17	374.6	81	79	01	16	02	0	0	1	1.080	65	5.1
AF879-3	288.6	84	84	0	14	00	0	0	2	1.082	73	12
ATD63-2	347.1	73	73	0	24	01	10	0	0	1.086	46	0.9
Atlantic	363.8	87	75	11	09	02	7	0	1	1.081	61	3.6
B0034-10	208.7	68	68	0	28	03	0	7	3	1.077	77	6.5
B0172-15	511.3	92	77	15	03	03	2	0	0	1.078	68	13
b0178-16	314.1	80	72	08	14	04	3	7	1	1.083	73	7.5
B0178034	352.9	90	74	15	08	01	7	3	1	1.081	67	2.8
B0202-4	336.6	84	84	0	14	01	1	0	0	1.080	56	5.6
B0234-4	392.3	82	81	00	13	03	10	0	0	1.074	65	5.0
B0257-3	293.4	69	69	0	29	00	0	1	3	1.086	58	4.2
B9792-2B	298.1	84	75	09	11	03	2	0	8	1.083	62	6.4
B9922-11	247.1	67	57	09	28	03	4	1	1	1.075	-	0.5
B9955-11	335.5	88	74	13	05	05	1	0	2	1.078	61	9.6
B9955-33	242.4	91	76	15	05	02	0	0	1	1.076	63	20
B9972-2B	294.1	78	75	02	18	02	2	0	2	1.081	63	7.5
D43	376.7	79	79	00	18	02	1	0	3	1.064	48	1.9
J8	457.9	72	68	04	16	10	0	0	0	1.062	59	6.4
MN12823	377.0	84	76	08	10	05	3	2	1	1.071	65	3.2
MN12828	291.0	67	67	0	21	10	0	0	0	1.070	60	10
MN12966	294.4	80	79	00	15	04	0	0	0	1.064	-	-
MN13540	303.6	64	64	0	32	02	0	3	2	1.067	62	-
MN13653	277.4	70	70	0	29	00	0	0	0	1.063	64	0.4
MN13740	331.8	82	80	01	16	00	2	0	4	1.070	69	7.1
MN9632	284.9	69	69	0	30	0	0	0	1	1.069	62	6.5
NDA2031-2	309.0	58	57	00	40	00	1	1	0	1.069	63	10
NDA2126-6	415.4	88	75	12	08	03	0	0	6	1.065	57	-
R. Nork	216.5	56	56	0	43	0	0	0	0	1.062	-	4.1
S465	312.4	84	84	0	12	02	0	0	0	1.075	70	2.2
TND22-2	306	84	84	0	14	01	0	0	2	1.074	63	5.0
W231	259.7	66	66	0	33	0	0	0	0	1.076	64	5.7
F100-1	344.8	86	82	4	12	2	2	2	0	1.080	-	4.6
A80559-2	374	91	73	17	7	3	2	0	0	1.079	70	9.3

1 - cwt/acre

2 - 20 tuber sample

3 - average of 2-3 Kg samples

4 - range of scab coverage: 0.4 (resistant) - 20 (susceptible)

III. POTATO SCAB RESEARCH

D. Douches, R. Hammerschmidt, K. Ludlam, R. Chase and C. Wallace

1. Evaluation of varieties and advanced selections for resistance to scab.
2. Identification of the factors responsible for scab resistance and characterization of the heritability of scab resistance.

Disease Resistance Research

During the summer of 1989, 86 named varieties and advanced selections were screened for scab resistance at the MSU Soils Farm, East Lansing, Michigan. Each line was tested as 5-hill plots, with three replications. At planting (June 6) all seed pieces were inoculated with a Streptomyces scabies spore suspension (deep pitted strain), and the open furrow was amended with S. scabies-infected vermiculite. Irrigation was not applied to supplement the summer rainfall (14.6 inches). Plots were mechanically harvested (Oct 3). Ten average-size tubers were randomly chosen from each plot for scab rating. Resistance to scab was based upon a rating for the amount of scab coverage (0, 1, 5, 10, and 25%). Overall rating of each line was based upon a sample of 30 tubers.

Table 1 shows the results of the russet/long white clones. The percent scab coverage can range from 0-25 in table 1. Also included are some well-tested lines that were used as references (Atlantic, Reddale Rideau, Superior, MS700-83, Onaway). Several lines were shown to have some resistance to S. scabies. The ranking of lines is for 1989 results. Lines that continue to show promise in Michigan will be tested a minimum of three years to obtain more stable ranking for their level of resistance. The 1989 data, however, should give an indication of each line's level of resistance that is found at the upper (resistant: < 3% coverage) and lower (susceptible: > 7.5% coverage) ends of the table. The ranking of the lines that are located in the middle of table may fluctuate over time, but these lines most likely will not have the highest level of resistance. Table 2 summarizes the 1989 data for round and red lines. The method of rating for percent scab coverage is identical to that of table 1.

In general, a number of advanced selections and recently named varieties that are russet or red types have shown some resistance to scab in 1989. The lowest level of infection was found in Russet Nugget, B9922-11, Hilite Russet, and ND791-5R, whereas the greatest infection was in B9955-33, MS40101, B0172-15, AF879-3, and A7411-2. High levels of resistance were not found among most of the round white types that are being tested for use in the chip processing

industry. The best round white clones in the trial were B0178-34, MN12823, and Atlantic.

Table 3 lists 18 diploid breeding lines which were evaluated. All of the lines had little or no scab infection, and may offer an additional source of resistance which can be incorporated in the breeding program.

A greenhouse screen for both advanced selections and for seedlings was used to enhance the breeding efforts. Pot tests, using plants grown from seed pieces, were used to augment field evaluations. Based on these results, we have been able to categorize the varieties and selections as resistant or susceptible (Table 4). We have also used this test to examine the interaction of several varieties with different isolates of S. scabies. This work is being carried out to determine the variability of plant response to different isolates of S. scabies that we have collected in Michigan.

A seedling screen was also developed in order to facilitate determining the resistance of individual progeny. In brief, individual seedlings were transplanted to seedling trays containing soil infested with S. scabies. This type of evaluation will be very useful in characterizing resistance as well as providing for an early evaluation step in variety development.

Michigan Table 1.

1989 Scab Trial: Russets and Long Types,
 Soils Farm, Michigan State University,
 East Lansing, MI.

<u>VARIETY</u>	<u>% Scab Coverage¹</u>
RUSSET NUGGET	0.5
B9922-11	0.5
HILITE RUSSET	0.6
A79239-8	1.2
A79141-3	2.2
LEMHI RUSSET (resistant)	2.8
AF465-2	3.0
RED LASODA	3.3
A74114-4	3.6
REDDALE	3.6
ATLANTIC	3.6
RUSSET NORKOTAH	4.1
B7592-1	4.2
RIDEAU	4.4
SUPERIOR	5.7
A78242-5	7.5
A79357-17	7.8
MS700-83 (susceptible)	8.1
ONAWAY	8.3
A76147-2	10.
A7411-2	12.
B9955-33	20..

¹Scab rating is based upon a 30 tuber average

Michigan Table 2. 1989 Scab Trial: Round and Red Types

<u>VARIETY</u>	<u>% Scab Coverage</u> ¹	<u>VARIETY</u>	<u>% Scab Coverage</u> ¹
ND791-5R (red)	0.3	B0034-10	6.5
D43	1.9	MN13740	7.1
S465	2.2	MS402-7	7.2
B0178-34	2.8	AF845-11	7.3
LEMHI RUSSET	2.8	B9972-2B	7.5
ND2224-5R (red)	3.1	B0178-16	7.5
MN12823	3.2	STUEBEN	7.7
RED LASODA	3.3	KANONA	8.0
REDDALE	3.6	MN10874	8.0
ATLANTIC	3.6	MS700-83	8.1
NDA2126-6	4.0	ONAWAY	8.3
B0257-3	4.2	ND860-2	8.3
RIDEAU	4.4	SOMERSET	8.3
W949-R (red)	4.5	A80559-2	9.3
NTD9-1068-11R (red)	4.5	MN13540	9.5
F100-1	4.6	ERAMOSA	9.5
W948-R (red)	4.7	B9955-11	9.6
TND22-2	5.0	MN12828	10.
B0234-4	5.0	NDA2031-2	10.
AF875-17	5.1	AF875-15	11.
ROSE GOLD	5.3	MS401-2	11.
LA01-38	5.5	MS402-8	11.
B0202-4	5.6	SAG GOLD	11.
SUPERIOR	5.7	MS401-8	11.
W231	5.7	AF879-3	12.
B9792-2B	6.4	B0172-15	13.
J8	6.4	MS401-1	19.
MN9632	6.5	B9955-33	20.

¹Scab rating based upon a 30 tuber average.

Michigan Table 3. 1989 Scab Trial: Diploid Seedlings. Michigan State University,
East Lansing, MI

CLONE	% SCAB COVERAGE ¹	CLONE	% SCAB COVERAGE ¹
133-124	0	133-227	1.35
133-47	0	133-293	1.4
133-158	0	133-9	1.6
133-151	0	133-16	2
133-273	0	133-30	2.36
133-187	0.066	LEMHI RUSSET	2.875
133-26	0.1	133-72	3
133-208	0.1	RED LASODA	3.305
133-128	0.166	RED DALE	3.667
133-149	0.166	ATLANTIC	3.675
133-67	0.5	SUPERIOR	5.737
133-197	0.6	ONAWAY	8.3
133-250	0.8	SOMERSET	8.333
133-87	0.818	SAG GOLD	11.417

¹Scab rating is based upon a 30 tuber average.

Michigan Table 4. 1989 Greenhouse Scab Test - Summer/Fall

CLONE	RATING*	TUBER TYPE	CLONE	RATING*	TUBER TYPE
NOOKSACK	1	Rus	133-16	2.6	2x
BURBANK	1	Rus	133-227	2.6	2x
LEMHI RUSSET	1	Rus	133-158	2.6	2x
SUPERIOR	1.1	Rnd	133-47	2.6	2x
133-72	1.3	2x	DM56-4	3	2x
84S10	1.3	2x	133-293	3	2x
ONTARIO	1.5	Rnd	133-250	3	2x
133-128	1.5	2x	MS716-15	3	Rnd
133-9	1.6	2x	133-30	3	2x
W5295.2	2	2x	85SD55	3	2x
133-124	2	2x	MONONA	3.1	Rnd
133-67	2	2x	MICHIGOLD	3.1	Yellow
133-197	2	2x	KATAHDIN	3.3	Rnd
R. BURBANK	2	Rus	SAG.GOLD	3.3	Yellow
84SD22	2	2x	P100-2	3.5	2x
ATLANTIC	2.3	2x	MS700-83	3.8	Rnd
133-151	2.3	Rnd	NDD277-2	4	Rnd
133-26	2.3	2x	133-87	4	2x
133-208	2.5	2x	Y245.7	4	Yellow
ONAWAY	2.5	Rnd	133-273	4	Rnd

* Based on three replications

1 = no lesions

5 = > 25% of the tuber surface covered with scab (pitted)

NEW YORK - LONG ISLAND

J. B. Sieczka, D. D. Moyer, J. M. Kossowski, and R. C. Neese

Introduction

Experiments conducted in 1989 are part of an ongoing program evaluating promising golden nematode resistant and russet-type potato clones under Long Island conditions. The experiments were conducted at the LIHRL and Corwith Farms in Water Mill, N.Y. Data were collected on total yield, size distribution, internal and external defects, and general appearance of the potato tubers. Results are presented for each experiment.

Early

Total yields of Superior, Sunrise and F70021 were not significantly different from each other. There were no significant differences in the marketable yield of the clones tested. Sunrise had the best appearance rating. Tubers of this entry are oblong with shallow eyes and bright white skin. Jemseg, Onaway and CS7639-1 produced tubers which were irregular in shape.

NE 107 White

In the main season experiment only 4 entries produced marketable yields below Katahdin. NY72 and LA01-38 had the highest marketable yield. Tubers of NY78 had the best appearance. Internal defects plagued many entries in this experiment. Hudson produced the highest percentage of tubers greater than 2.5 inches.

Cornell White

Clones that produced significantly greater marketable yields than Katahdin are FL657 (81% more), NY72 (68%), NY84 (36%), and F24-12 (25%). Only F24-3 had a significantly lower marketable yield than Katahdin. Tubers of NY72, NY85, E55-27 and E55-44 had specific gravity readings higher than 1.070. Internal defects plagued many entries. Those with very few were NY72 and E11-24. The best appearing clones were NY78, NY84, F24-3, FG6-15. Pinkeye and rot were major defects of NY81.

USDA White

Only B7592-1 and B9792-8B had significantly higher yields than Katahdin. B0257-9 and B9955-46 had significantly lower yields. The entries B0175-20 and B0175-21 had specific gravity readings greater than 1.080. The appearance ratings of B0241-8 and B0329-10 were equal to Katahdin. Hollow heart affected most clones. B0242-2 and B0257-3 were relatively free of this defect.

USDA Russet

The highest marketable yields were produced by Coastal Russet, B9922-11 and F143-1. Appearance ratings of Coastal Russet and F143-1 were the best of the lines tested. Hollow heart was most severe in B0319-26 and B9922-11. About one-half of the tubers of these lines were affected. Scab was a major defect in B0045-6 and B0493-8. Other lines affected were BelRus, B0309-11, B0319-26 and F143-1.

NE107 Russet

Russet Burbank, Coastal Russet, A74114-4 and B0220-14 produced marketable yields that were not significantly different from each other (Tables 11 & 12). Tubers of Coastal Russet were the smoothest of the entries tested. Russet Burbank and B0045-6 had the worst appearance ratings. Hollow heart was especially bad in B0220-14.

South Fork	Only the russet entry, F143-1, produced a significantly lower marketable yields than Katahdin. Appearance rating of Katahdin and NY78 were the highest. Internal defects were minimal in all lines tested. B7592-1 and NY72 produced the highest yields but not significantly higher than Katahdin.
Red-Skinned	Total yields of Chieftain, La Rouge and Red Dale were significantly higher than other lines. Purple 5, Redsen and B0032-35 produced significantly lower marketable yields than Chieftain. Red Dale tubers had a high percentage of brown center. The best appearing tubers were produced by Redsen and B0032-35. Red Dale tubers had the worst appearance.
Yellow-fleshed	Only two yellow fleshed lines (Yukon Gold and Red Gold) were evaluated. Both produced relatively low yields. Yukon Gold had a significantly higher specific gravity and more hollow heart than Red Gold. Internal necrosis was present in both lines but Red Gold had considerably more than Yukon Gold.
Fertilization	The total and 2 to 4 inch yield of B7592-1 and NY78 began to plateau at 150 lb N/A (Table 19). The yields tended to drop at rates of 250 lb N/A. Specific gravity of B7592-1 tubers were lowest at zero nitrogen. Nitrogen rate did not affect specific gravity readings of NY78. Nitrogen rates of 100, 150 or 200 lb N/A had no significant affect on yield or specific gravity of F70021. Scab was a major defect in this line however, scabby tubers were not scored.
Storage Results	After-cooking darkening and blackspot ratings for clones grown in 1988 are given in Table 20.
Observation	Comments on early selection, 20-hill plots are listed in Table 21.
Acknowledgements	Seed was provided by Robert L. Plaisted, Cornell University; K. G. Haynes, USDA; Gregory A. Porter, University of Maine and Walter Mehlenbacher, Castile, N. Y. Special thanks are extended to the Corwith Brothers for providing the land, and assistance in the establishment of the experiment on the South Fork. The assistance of Bennett Orlowski, Rod Zeltmann, Mark Sisson and Gloria Stoetzel is greatly appreciated.

Long Island Table 1. Yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for early-season white-skinned clones grown at Riverhead, N.Y. - 1989

Clone	Total Yield cwt/A	Marketable Yield percentage cwt/A of std.	Size Distribution by Class(%)				Spec Grav	
			2- 2.5-		3-25-			
			<2	2.5	3.25	4 >4		
Early - 116 days								
Superior (Std.)	379	230	100	26	42	32	1	
Chaleur	270	175	76	11	22	65	2	
Jemseg	270	103	45	18	31	47	3	
Norchip	274	146	63	38	46	16	1	
Onaway	276	150	65	17	36	46	0	
Sunrise	312	205	89	27	47	25	1	
CS7639-1	303	139	60	28	36	35	1	
F70021	324	168	73	20	34	46	0	
<i>Waller-Duncan LSD (K=100)</i>	(71)	(ns)						
(3)								

Long Island Table 2. Maturity, tuber shape, and internal and external defects, for early-season white-skinned potato clones grown at Riverhead, N.Y. - 1989

Clone	Matur. on 8/7/89 1/	Tuber Data 1/				Tuber Defects (%) 2/				No/40 Tubers			
		Shape	Appeari- ance	Total	Sun- burn	Mis- shapen	Growth cracks	Other	Hollow heart	Brown center	Internal Necrosis	SI Mod	Sev
Early - 116 days													
Superior (Std.)	5.3	R - O	5.8	13.7	5.5	3.6	0.1	4.4		18	2	0	0
Chaleur	4.5	R - O	6.5	23.7	9.3	2.0	0.9	11.6		11	0	1	0
Jemseg	5.8	O	4.3	42.5	14.8	5.1	2.7	19.9		14	1	0	0
Norchip	5.8	R	6.5	9.1	2.4	5.3	0.0	1.5		4	0	0	0
Onaway	6.0	R - O	4.0	28.7	7.1	18.2	0.9	2.4		3	0	1	0
Sunrise	5.0	O	7.8	7.3	5.0	1.6	0.0	0.8		3	0	0	0
CS7639-1	6.5	O - R	4.8	26.3	7.0	1.1	0.8	17.3		5	0	0	0
F70021	5.8	R - O	6.3	28.7	13.6	2.9	0.0	12.2		9	0	1	0

1/ See rating system outlined in the text.

2/ Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U. S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 3. Yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for main-season white-skinned clones grown at Riverhead, N.Y. - 1989

(73) _____ (4)

Long Island Table 4. Maturity, tuber shape, and internal and external defects, for main-season white-skinned potato clones grown at Riverhead, N.Y. -1989

Clone	Matur. on 8/31/89	Tuber Data 1/ Appear- ance			Tuber Defects (%) 2/ Mis- shapen cracks Other			No/40 Tubers		
		Shape	Total	Growth	Hollow heart center	Brown center	Internal Necrosis S1 Mod S2			
Main-season - 144 days										
Katahdin (Std.)	4.5	R - O	6.5	2	0	0	1	7	6	0
Atlantic	4.8	R - O	6.8	3	2	0	1	23	0	6
Hudson	5.5	R - O	5.0	23	1	0	22	9	3	5
Kennebec	4.5	O	5.0	8	7	0	2	2	0	0
AF828-5	4.5	O	6.0	2	2	0	0	2	1	1
AF875-16	4.5	O-R	5.3	4	1	0	3	30	0	0
AF875-17	3.5	R - O	5.3	3	1	0	2	13	0	3
AF879-3	3.5	R - O	5.0	5	1	0	4	31	0	0
AF1060-2	6.3	R	6.3	6	4	0	3	7	1	2
B0257-3	2.8	R	4.8	13	0	0	12	1	0	0
B9792-157	3.5	R - O	4.3	7	4	0	3	36	0	0
B9792-158	4.3	O	4.3	4	3	0	0	33	2	2
B9935-10	3.3	R - O	6.5	2	0	0	1	22	3	0
B9955-46	3.8	R	3.8	27	0	0	27	10	6	1
F77087	5.5	O	4.8	20	3	0	17	9	1	2
LA 01-38	6.8	O	5.0	3	2	0	1	4	0	0
NY72	6.3	R	6.5	2	0	0	2	1	0	0
NY78	5.0	O-R	7.5	2	1	0	1	14	3	0
WF31-4	3.0	R	4.0	2	1	0	1	32	0	6
										8

1/ See rating system outlined in the text.

2/ Sunburned tubers not scored. Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 5. Yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for white-skinned clones, primarily from the Cornell potato breeding program, grown at Riverhead, N.Y. - 1989

Clone	Total Yield cwt/A	Marketable Yield cwt/A	Size Distribution by Class(%)				Size Distribution			Spec Grav	
			<2		2- 2.5	2.5- 3.25	3- 4	>4	2 to 2.5 to 4 in.		
			percentage of std	cwt/A of std							
Cornell - 144 days											
Katahdin (Std.)	414	293	100		23	40	37	1	0	77	
Superior	482	315	107		18	40	42	1	0	82	
NY72	595	494	168		12	28	58	2	0	88	
NY78	429	318	109		22	40	38	1	0	78	
NY81	439	288	98		15	29	53	3	0	78	
NY84	514	400	136		18	35	45	1	0	85	
NY85	363	230	79		31	40	28	1	0	85	
E11-45	504	350	119		21	41	38	1	0	79	
E40-10	308	238	81		15	26	53	5	0	85	
E55-27	459	311	106		25	44	31	0	0	85	
E55-44	454	375	128		13	32	54	1	0	75	
F24-3	278	189	64		29	41	30	1	0	71	
F24-12	485	365	125		19	34	47	1	0	81	
FG6-6	458	300	102		32	53	15	0	0	68	
FG6-15	411	337	115		15	34	47	2	1	84	
FL657	621	532	181		10	25	62	4	0	90	
<i>Waller-Duncan</i>										65	
<i>LSD (K=100)</i>	(80)	(69)								61	

Long Island Table 6. Maturity, tuber shape, and internal and external defects for clones, primarily from the Cornell potato breeding program, grown at Riverhead, N.Y.

Clone	Matur. on 8/31/89	1/	Tuber Data 1/			Tuber Defects (%) 2/			No/40 Tubers			
			Shape	Appeari- ance	Total	Mis- shapen			Growth cracks	Other	Hollow heart	Brown center
						SI	SI	Mod	Sev		Internal Necrosis	
Cornell - 144 days												
Katahdin (Std.)	3.8	O - R	4.3		6.5	0.7	0.0	5.8		12	7	1
Superior	2.5	O - R	3.5		16.8	7.7	0.1	9.0		7	1	0
NY72	6.8	R	5.8		5.0	1.0	0.0	4.0		0	1	0
NY78	4.8	O	6.8		4.2	1.8	0.3	2.1		5	1	0
NY81	4.0	R - O	6.0		19.2	0.7	0.3	18.2		18	4	0
NY84	4.0	R - O	6.8		4.1	1.1	0.1	2.9		4	0	2
NY85	4.0	R - O	5.3		5.3	4.0	0.0	1.4		12	0	2
E11-45	4.3	R - O	6.3		9.5	1.6	0.3	7.5		3	0	1
E40-10	2.3	R	6.5		7.6	0.4	0.0	7.2		3	4	0
E55-27	2.5	R	5.0		6.9	0.8	0.0	6.1		2	1	0
E55-44	2.5	O - R	5.8		4.7	1.9	1.3	1.5		22	1	0
F24-3	2.8	O	6.8		1.3	0.6	0.0	0.6		12	7	2
F24-12	2.8	O - R	6.5		6.0	1.0	0.1	4.9		16	4	0
FG6-6	5.0	O	6.3		2.7	1.4	0.5	0.8		11	0	0
FG6-15	2.8	O - R	6.8		2.2	0.7	0.0	1.4		5	4	1
FL657	3.8	O - R	5.5		4.5	0.9	0.0	3.6		4	0	1

1/ See rating system outlined in the text.

2/ Sunburned tubers not scored. Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U. S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 7. Yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for white-skinned clones from the USDA potato breeding program grown at Riverhead, N.Y. - 1989

Clone	Total Yield cwt/A	Marketable Yield percentage cwt/A of std	Size Distribution by Class(%)				Spec Grav
			<2		2.5-3.25-	3.25-4	
			2-	2.5	3.25	4	
USDA - 144 days							
Katahdin (Std.)	384	262	13	36	49	2	0
B0172-22	494	298	14	42	43	1	0
B0175-20	419	221	84	15	35	47	3
B0175-21	506	298	114	12	36	51	1
B0178-34	485	356	136	14	27	53	6
B0209-1	403	286	109	12	30	55	2
B0240-11	298	168	64	24	42	33	2
B0241-8	364	235	90	23	34	42	1
B0242-2	335	235	90	21	46	32	0
B0257-3	354	199	76	20	48	31	0
B0257-9	339	134	51	15	42	42	1
B0329-10	377	217	83	14	59	26	1
B7592-1	564	419	160	17	44	39	1
B9792-2B	395	290	111	18	41	42	0
B9792-8B	647	493	188	10	36	52	2
B9792-157	470	343	131	17	31	47	5
B9792-158	486	276	106	21	39	40	0
B9955-46	331	146	56	11	31	58	0
<i>Waller-Duncan LSD (K=100)</i>							
			(79)				
			(104)				

Long Island Table 8. Maturity, tuber shape, and internal and external defects for clones from the USDA potato breeding program grown at Riverhead, N.Y. - 1989

Clone	Matur. on 8/31/89	Shape 1/ R-O	Tuber Data 1/ Appeari- ance	Tuber Defects (%)/ Mis- shapen cracks Other			No/40 Tuber Hollow Brown heart center			Internal Necrosis SI Mod Sev			
				Total			2/						
				18.9	2.8	0.0	16.1	6	4	0	0	0	0
Katahdin	5.3	R-O	5.8	26.1	5.6	1.0	19.5	33	0	1	0	0	0
B0172-22	4.5	R-O	4.8	32.4	7.8	2.3	22.3	19	1	1	0	0	0
B0175-20	4.8	O-L	4.3	28.4	5.7	3.5	19.2	16	1	0	0	0	0
B0175-21	4.0	O	4.8	12.4	8.1	0.4	3.8	14	4	1	0	0	0
B0178-34	5.5	R-O	4.3	16.7	7.9	0.4	8.4	22	0	0	0	0	0
B0209-1	4.5	O-R	3.8	19.7	1.7	0.6	17.5	32	0	0	0	0	0
B0240-11	2.8	R	3.8	12.6	1.1	0.0	11.5	24	1	0	1	0	0
B0241-8	2.8	R	5.8	8.5	0.9	0.0	7.6	2	0	2	0	1	0
B0242-2	3.0	R-O	5.3	23.5	2.5	0.2	20.8	2	1	1	0	0	0
B0257-3	3.0	R	5.0	45.5	5.1	1.0	39.4	19	0	2	1	0	0
B0257-9	2.8	R-O	5.0	15.0	3.8	0.2	11.0	18	0	0	0	0	0
B0329-10	5.0	O-L	5.8	8.9	5.2	1.4	2.3	11	1	0	0	0	0
B7592-1	4.0	O-L	5.0	9.0	6.1	1.2	1.7	24	2	0	0	0	0
B9792-2B	4.0	R-O	4.3	13.7	8.9	0.3	4.5	24	0	0	0	0	0
B9792-8B	6.8	O-R	4.8	10.2	6.2	0.3	3.7	23	0	0	0	0	0
B9792-157	4.5	O-R	3.5	22.4	3.2	0.4	18.9	28	0	0	1	0	0
B9792-158	4.5	O	3.8	45.0	0.7	0.8	43.5	8	2	0	0	0	0
B9955-46	4.0	R	5.3										

1/ See rating system outlined in the text.

2/ Sunburned tubers not scored. Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U. S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 9. Yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for russet-skinned selections, from the USDA and Cornell potato breeding programs, grown at Riverhead, N.Y. - 1989

Clone	Total Yield cwt/A	Marketable Yield cwt/A of std	Size Distribution by Class(%)				(ns)	
			Size Distribution by Class(%)					
			<4 oz	4 to 8 oz	8 to 12 oz	12 oz >16 oz		
Russets - 144 days								
BelRus	252	163	30	54	16	1	70	
Coastal (NE 107)	404	305	21	55	22	2	79	
Coastal (USDA)	401	270	30	49	17	3	69	
B0045-6	498	211	28	49	19	2	79	
B0309-11	293	145	37	52	10	1	63	
B0319-26	323	218	26	53	18	3	74	
BO493-8	437	157	14	40	31	4	82	
B9922-11	453	336	20	51	22	5	79	
F143-1	435	312	21	47	24	6	77	
Waller-Duncan		(61)	(100)				30	
LSD (K=100)							71	

Long Island Table 10. Maturity, tuber shape, and internal and external defects, for russet-skinned potato clones, from the USDA and Cornell potato breeding programs, grown at Riverhead, N.Y. - 1989

Clone	Matur. on 8/31/89 1/	Shape	Tuber Data 1/			Tuber Defects (%) 2/			No/40 Tubers			
			Appear- ance			Total	Sun- burn	Mis- shapen	Growth cracks	Other	Hollow heart	Brown center
											SI	Mod
Russets - 144 days												
BelRus	2.0	L	5.3	5.4	0.5	1.7	0.0	3.2	1	0	1	0
Coastal (NE107)	2.3	L	7.0	3.2	1.0	1.2	0.6	0.5	0	0	3	2
Coastal (USDA)	1.5	L	6.8	1.7	1.4	0.0	0.3	0.0	0	0	0	0
B0045-6	3.3	O	4.3	27.9	0.9	1.4	0.0	25.6	2	1	2	0
B0309-11	1.8	L	6.0	13.7	1.3	4.0	0.4	8.0	2	0	0	0
B0319-26	2.8	L	5.5	6.4	1.5	2.9	0.0	2.0	21	0	2	0
BO493-8	3.0	L-O	4.3	46.4	1.7	1.2	0.6	42.9	7	2	0	0
B9922-11	4.8	L-O	5.0	5.1	0.2	2.0	0.5	2.3	20	0	0	1
F143-1	4.0	L	7.3	5.7	1.4	3.3	0.2	0.8	6	1	1	0

1/ See rating system outlined in the text.

2/ Sunburned tubers not scored. Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorables against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 11. Yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for russet-skinned clones grown at Riverhead, N.Y. - 1989

Clone	Total Yield cwt/A	Marketable Yield percentage cwt/A of std	Size Distribution by Class(%)			Size Distribution		
			< 4			4 to 8 oz		
			> 16 oz			8 to 12 oz		
Russets - 144 days								
BelRus (Std)	254	141	39	49	12	1	0	61
Coastal	399	267	29	53	16	2	0	71
Russet Burbank	517	282	26	51	22	1	0	74
A74114-4	473	258	35	44	18	3	0	65
B0045-6	474	146	35	50	13	1	1	64
B0220-14	393	262	28	51	16	5	0	72
<i>Waller-Duncan LSD (K=100)</i>	(47)	(98)						(4)

Long Island Table 12. Maturity, tuber shape, and internal and external defects, for russet-skinned potato clones grown at Riverhead, N.Y.

Clone	Matur. on 8/31/89	Tuber Data 1/ Shape	Tuber Defects (%) 2/			No/40 Tubers		
			Sun- burn Total Mis- shapen cracks Other			Hollow heart	Brown center	Internal Necrosis
			Total	S1	Mod	Sev		
Russets - 144 days								
BelRus (Std)	2.3	L	5.5	5.5	0.3	4.0	0.0	1.2
Coastal	2.5	L	7.0	4.2	0.8	2.6	0.3	0.4
Russet Burbank	6.8	L	3.0	19.8	1.4	17.0	0.2	1.1
A74114-4	4.5	L	4.5	10.0	0.8	1.2	0.6	7.4
B0045-6	4.0	O - L	3.8	33.4	1.7	2.5	0.2	29.0
B0220-14	3.0	L	6.3	5.1	1.7	2.6	0.2	0.6

1/ See rating system outlined in the text.

2/ Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 13. Yield, marketable yield, percentage of yield by grade size distribution and tuber data for potato clones grown at Water Mill, N.Y. - 1989

Clone	Total Yield cwt/A	Marketable Yield percent of std	Size by Class(%)		Maturity on 8/14/89	Tuber Data 1/ Shape	Appearance
			<2"	2 to 4" >4"			
South Fork - 137 days							
Katahdin (Std.)	445	372	100	16	84	0	7.3
Hudson	368	281	75	22	78	0	8.0
Superior	413	336	90	18	82	0	3.7
AF828-5	476	397	107	16	84	0	6.0
B7592-1	520	436	117	16	84	0	6.0
CS7639-1	445	364	98	17	83	0	5.7
E11-45	497	380	102	23	76	1	6.7
E40-10	337	284	76	15	85	0	4.3
F143-1(RUS)	393	216	58	41	59	0	4.3
F70021	376	270	73	26	74	0	3.7
FL657	438	389	105	11	89	0	7.0
NY72	495	428	115	13	87	0	6.7
NY78	405	309	83	23	77	0	7.3
NY84	439	342	92	21	78	1	6.3
<i>Waller-Duncan</i>							
<i>LSD(k=100)</i>	(98)	(106)					

1/ See rating system outlined in the text.

Long Island Table 14. External and internal defects of potato clones grown at Water Mill, N.Y. - 1989

Clone	Tuber Defects (%)						No/30 Tubers		
	Total	Sun- burn	Mis- shapen	Growth cracks	Other 1/ heart	Hollow center	Brown center	Internal Necrosis	
		Sev	Sev	Sev	Sev	Sev	Sev	SI	Mod
South Fork - 137 days									
Katahdin (Std.)	3.1	0.1	0.8	2.2	0.0	7	0	0	0
Hudson	7.2	0.0	0.0	5.0	2.2	1	0	0	0
Superior	1.7	0.0	1.6	0.2	0.0	1	1	0	0
AF828-5	3.2	0.0	3.2	0.0	0.0	1	0	0	0
B7592-1	4.0	0.0	4.0	0.0	0.0	2	0	0	0
CS7639-1	4.9	0.0	4.9	0.0	0.0	1	0	0	0
E11-45	0.6	0.0	0.6	0.0	0.0	3	0	0	0
E40-10	0.7	0.2	0.5	0.0	0.0	0	0	0	0
F143-1(RUS)	8.3	0.0	2.9	5.4	0.0	3	0	0	0
F70021	7.7	0.0	2.1	5.6	0.0	3	0	0	0
FL657	0.6	0.0	0.6	0.0	0.0	1	0	0	0
NY72	1.9	0.3	1.6	0.0	0.0	0	0	0	1
NY78	1.7	0.0	1.7	0.0	0.0	0	3	0	1
NY84	1.4	0.0	1.1	0.0	0.3	0	0	1	0

I/ Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U. S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 15. Yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for red-skinned clones grown at Riverhead, N.Y. - 1989

Clone	Total		Marketable Yield		Size Distribution by Class(%)				Size Distribution	
	Yield cwt/A	percentage cwt/A of std	<2		2- 2.5		2.5- 3.25		3.25- >4	
			>2		2.5		3.25		4	
Red-skinned - 144 days										
Cheftain (Std.)	387	244	100	35	33	31	1	0	65	32
La Rouge	381	214	88	41	36	23	0	0	59	24
Norland	277	124	51	53	34	12	0	0	47	12
Norland(Dk red)	281	189	77	30	40	28	1	0	70	29
Sangre	317	173	71	44	33	23	1	0	56	24
Purple 4	285	205	84	28	39	33	0	0	72	34
Purple 5	212	95	39	55	31	14	0	0	45	14
Red Dale	436	296	121	25	28	41	7	0	75	47
Redsen	218	104	43	51	31	18	0	0	49	18
B0032-35	216	111	45	49	41	11	0	0	51	11
Waller-Duncan										
LSD (K=100)	(64)	(78)								
										(ns)

Long Island Table 16. Maturity, tuber shape, and internal and external defects, for red-skinned potato clones grown at Riverhead, N.Y.

Clone	Tuber Data 1/ Matur. on 8/31/89 1/		Tuber Defects (%)/ Appear- ance			No/40 Tubers			Internal Necrosis		
	Total	Shape	Mis- shapen	Growth cracks	Other	Hollow	Brown	heart center	SI	Mod	Sev
Red-skinned - 144 days											
Cheftain (Std.)	2.3	O-R	6.8	2.0	1.2	0.7	0.1	0	1	2	0
La Rouge	4.0	O	5.0	3.2	2.6	0.4	0.3	5	5	1	0
Norland	2.0	O-R	6.8	2.0	1.8	0.2	0.0	0	2	1	0
Norland(Dk red)	2.0	O-R	6.5	2.5	0.9	1.5	0.1	2	3	0	1
Sangre	3.3	O	5.5	1.7	1.6	0.1	0.1	6	1	1	0
Purple 4	2.0	R-O	6.8	0.2	0.2	0.0	0.0	0	1	3	0
Purple 5	2.0	O	6.5	0.6	0.3	0.0	0.3	4	0	2	0
Red Dale	2.5	O	4.3	7.5	6.6	0.9	0.0	1	13	0	0
Redsen	1.8	R	7.8	0.7	0.4	0.2	0.1	0	0	0	0
B0032-35	2.0	R	7.0	0.1	0.1	0.0	0.0	0	0	0	0

1/ See rating system outlined in the text.

2/ Sunburned tubers not scored. Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorables against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 17. Yield, marketable yield, percentage of yield by grade, size distribution and specific gravity for yellow-fleshed clones grown at Riverhead, N.Y. - 1989

Clone	Total Yield cwt/A	Marketable Yield percentage cwt/A of std	Size Distribution by Class(%)				Size Distribution		Spec Grav
			<2	2- 2.5-	3-3.25-	>4	2 to 2.5 to 4 in.	4 in.	
Yellow-fleshed - 144 days									
Yukon Gold(Std)	302	217	100	23	40	37	0	0	72
Red Gold	253	149	69	38	44	18	0	0	67
<i>Waller-Duncan LSD (K=100)</i>	(ns)	(ns)	(ns)	(ns)	(ns)	(ns)	(ns)	(ns)	(3)

Long Island Table 18. Maturity, tuber shape, and internal and external defects, for yellow-fleshed potato clones grown at Riverhead, N.Y. -1989

Clone	Matur. on 8/31/89	Tuber Data I/			Tuber Defects (%)/			No/40 Tubers		
		Shape	Appeari-	Total	Mis- shapen	Growth cracks	Other	Hollow heart	Brown center	Internal Necrosis
Yellow-fleshed - 144 days										
Yukon Gold(Std)	1.0	R - O	5.0	5.4	3.5	0.1	1.9	18	3	1
Red Gold	2.0	R	5.3	3.1	2.0	0.2	0.9	8	5	1
								10	10	0

1/ See rating system outlined in the text.

2/ Sunburned tubers not scored. Other includes defects such as rhizoctonia, prominent lenticels, pink eye, decay and other defects scorable against a U.S. No. 1 grade. Mechanical defects, however, were not scored.

Long Island Table 19. The effect of nitrogen rate on yield, 2 to 4 inch yield, percentage of yield by grade, size distribution and specific gravity for B7592-1, NY78 and F70021 grown at Riverhead, N.Y. - 1989

Long Island Table 20. After cooking darkening and blackspot ratings of clones grown in 1988.

Cornell Lines				NE107 White				Advanced GN				Red				NE107 Russet				USDA Russet			
Clone	Rating	Clone	Rating	Clone	Rating	Clone	Rating	Clone	Rating	Clone	Rating	Clone	Rating	Clone	Rating	Clone	Rating	Clone	Rating	ACD	BS		
ACD	BS	ACD	BS	ACD	BS	ACD	BS	ACD	BS	ACD	BS	ACD	BS	ACD	BS	ACD	BS	ACD	BS				
Katahdin	4.5	6.0	Katahdin	4.7	6.0	Katahdin	4.7	6.0	Norland	3.1	5.9	BelRus	4.9	5.9	BelRus	4.7	5.8						
F24-6	4.7	5.6	Atlantic	4.6	5.9	Superior	5.0	5.7	Chieftain	4.8	5.9	Coastal	4.1	6.0	Coastal	3.9	5.8						
F24-12	4.1	5.9	Hudson	4.7	5.8	B0034-10	5.0	5.9	LaRouge	4.4	5.9	R.Burbank	4.9	5.8	Hilat	4.6	5.9						
F25-3	4.4	6.0	Kennebec	4.8	5.9	B7592-1	5.0	5.8	Purple 4	4.3	5.7	A74114-4	4.3	6.0	B0045-6	4.3	6.0						
F103-1	4.7	5.9	A76147-2	4.4	5.7	B9935-10	4.7	6.0	Sangre	4.7	5.9	B0045-6	4.1	5.9	B9569-2	4.6	5.8						
FG6-3	4.3	6.0	AF875-16	4.6	4.5	B9935-46	4.8	5.8	B0032-40N	4.9	5.9	B0220-14	4.7	5.1	B9922-11	4.2	6.0						
FG6-4	3.8	6.0	B0172-15	4.1	5.7	D146-11	4.8	5.8	B0032-40U	4.8	6.0				B9932-50	4.7	5.9						
FG6-6	4.5	6.0	B0242-2	4.6	5.6	D147-9	4.4	6.0	D191-2	4.9	5.9				F128-1	4.9	6.0						
			B0243-18	4.4	5.6	D183-2	5.0	5.9	D191-103	5.0	5.9				F143-1	4.0	5.7						
			B9792-61	4.8	5.8	E40-10	4.8	6.0															
			B9792-157	4.8	4.3	NY72	4.8	5.9															
			C7635-4	4.6	6.0	NY78	4.9	5.9															
			ND860-2	3.4	5.9	NY79	4.9	6.0															
			NY72	4.5	5.9	NY81	4.8	5.8															
			NY81	4.5	5.8																		
			WNC521-12	4.5	5.9																		
Waller-																							
Duncan																							
	(0.05)	(0.5)	(0.2)		(0.3)	(1.3)		(0.2)	(0.1)		(0.4)	(0.1)		(0.5)	(0.2)		(0.4)	(0.1)					

After-cooking darkening (ACD) ratings based on a scale of 1 to 5; 5 = no darkening, 1 = severe after cooking darkening. Five tubers rated per replication; four replications in each experiment.

Blackspot (BS) determinations are based on approximately twelve tubers per replication. Tubers were stored at 400 F and bruised between 2/27 and 3/14/89. Bruised areas were peeled and evaluated two days after impact. Each tuber received a blow in each of two locations about 1 to 2 cm from the stem end. The bruising was done by dropping a 100 gram weight a distance of 30 cm. The point of impact was marked by inking the base of the weight. Ratings are based on a scale of 1 to 6 with 6 = no discoloration and 1 = severe discoloration.

Long Island Table 21. Results of non-replicated observational trial-1989.

Clone	H	H	Int.	Nec	Spec.	Yield	Color	Texture	Shape	App.	Comments
			(no/10 tubers)		Grav.						
Chieftain	0	1	66	High	MR	RS	R-O	8.5			Russet
Coastal Russet	1	0	62	Medium	T	LRu	L	7.6	SE,SI Irr	B0178-41	B0220-14
Katahdin	4	0	64	Medium	W	RS	R-O	7.0	Some Sc	B0179-01	B0386-09
Superior	2	0	74	High	Bu	SN	O-R	6.0	MDE	B0179-05	B0397-02
Promising clones											
B0190-09	0	1	78	High	T	LRu	L	8.0	SE	B0179-17	B0566-05
B0202-04	1	0	76	High	W	R	7.0	MDAE		B0179-18	B0595-01
B0615-05	0	1	61	Medium	M-LR	R	8.0	MSE		B0191-05	B0595-04
B0616-01	0	0	63	DR	N	R	8.0	Sm,SE		B0234-04	B0601-01
B0622-02	1	3	73	Medium	W	R	7.0	SE,Med size		B0243-07	B0608-06
B0642-06	0	0	70	W	O-R	6.0	SE	B0243-18		B0554-01	B0338-02
								B0347-04		B0554-02	B0338-09

Abbreviations:

Color: B = brown, Bu = Buff, BW = bright white, C = cream, MR = medium red, P = pink, Pu = purple, W = white, T = tan.

modifiers; B = bright (as in bright red), D = dark, L = light, M = medium.

Texture: HRu = heavy russet, LRu = light russet, MRu = moderate russet, N = netted,

PRu = partially russetted, RS = relatively smooth, SN = slight net, S = smooth.

Shape: C = cylindrical, O = oblong, L = long, R = round.

Eye Depth: D = deep, I = intermediate, M = medium, S = shallow, Modifier; V = very.

Appearance: rated on a scale of 1 to 9; 1 = extremely rough, unattractive, 9 = smooth, attractive.

Comment abbreviations: Att = attractive, CT = chain tubers, DAE = deep apical eyes,

DSE = deep stem end, HS = heat sprouts, Irr = irregular, JER = jelly end rot,

Kn = knobs, MDAE = moderately deep apical eyes, MSE = moderately shallow eyes, PE = pink eye, Sk = skinned, SI Irr = slightly irregular, Y = yellow, L = prominent lenticels, Rh = rhizoctonia, Sc = scab, SED = stem end decay, Sm = small.

NEW YORK - UPSTATE

D. E. Halseth and W. L. Hymes

Program Scope

The Vegetable Crops Department, Cornell University, conducted potato variety yield trials in four counties in upstate New York in 1989 in which a total of twenty-four named and fifty-five numbered clones were evaluated. Six replicated variety yield trials were conducted at the Thompson Vegetable Research Farm at Freeville in Tompkins County on a Howard gravelly loam. Grower trials were conducted on mineral soils near Arkport in Steuben County and near Gainesville in Wyoming County and on muck soil near Savannah in Wayne County. As evaluation of potato lines with golden nematode (GN) resistance is one of our program's highest priorities, a high percentage of new breeding lines in these trials have GN resistance (57%). Marketable yield, tuber quality and appearance, maturity, storage life and processing potential are among the important characteristics which are evaluated. Additional information on variety x nitrogen fertilization, storage and chipping research can be obtained from the authors.

Research Farm

All 79 entries mentioned above were evaluated in randomized complete block plots which were replicated four times at Freeville. These experiments were planted at 9" spacing on a 34" bed with 1075 lbs/A of 14-14-14 applied in bands at planting. Seedpiece treatment was Maneb 8D-IF. Weed control consisted of Lorox 50DF 3 lb/A sprayed preemergence on May 9 and Lexone 75DF 0.2 lb/A sprayed postemergence on July 7. Insect control utilized applications of Ambush 2E, Guthion 2S, PBO (piperonyl butoxide), Thiodan 3EC, and Vydate L. Disease control of foliar pathogens used applications of Dithane F45, Manzate 200DF, and Super-tin 4L. One application of sprinkler irrigation (one inch) was applied at the end of July. Hilling was accomplished on June 20 and vine kill used Evik 80WP 3 lb/A + Booster 2 qt/A [vine kill dates on tables].

Seasonal

Weather was wetter and colder than normal during the May planting, near normal for June and July, but warmer and much dryer from mid-July through August. These hot, dry conditions contributed to a much higher percentage of bruised tubers. Misshapen, hollow heart and heat necrosis were the most common tuber defects. Yields and specific gravity were average to above average. Early blight was not a problem, but scab, Rhizoctonia and silver scurf were observed on many lines.

Promising Entries

Replicated variety yield trial data from 1989 experiments grown at Freeville, NY, are presented in Tables 1 through 12. In the early maturity trial only B0257-3 and LaRouge outyielded Superior, and no entries were earlier in maturity. B0257-3, LaRouge, Red Gold, and Superior had high levels of internal necrosis. Sangre and B9792-157 [Coastal Chipper] yielded better than Atlantic in the medium maturity trial, while AF875-

16 had higher specific gravity. Atlantic and Coastal Chipper also had high incidences of hollow heart. Six entries yielded higher than Katahdin in the medium-late maturity trial, while two had lower dry matter. B0034-10, B0240-11 and WF31-4 had hollow heart problems, while B9792-158 had vascular discoloration. Steuben had the highest yield in the late maturity trial, while B0172-15, B9792-2B, and B9792-8B had extremely high specific gravity readings. B0172-15 and B9792-8B also had a very high incidence of hollow heart. A7411-1 and Coastal Russet had the best appearance ratings and highest marketable yield in the russet trial. B0045-6 had the lowest percentage of external defects while Coastal Russet had the lowest (none) internal defects.

Grower variety trial results from three locations are presented in Tables 13 through 15. The Steuben County trial had excellent yields, with nine clones equal or better than Monona in marketable yield and only one with lower specific gravity. Hollow heart was the only significant defect, with Atlantic, F24-12 and F100-1 having unacceptable levels. The Wyoming County trial, while being the only irrigated grower trial, experienced drought stress and had lower yields and dry matter. Only one clone had yield below Monona, while all but one had higher dry matter. Atlantic was the only variety with hollow heart problems. The muck soil trial in Wayne County evaluated 32 clones, 25 of which had higher marketable yields than the standard Katahdin. Steuben had the highest yield while Atlantic had the highest dry matter. Atlantic and Yukon Gold had hollow heart problems.

Table Headings
Explanation

Marketable yield in hundredweight per acre (cwt/a) was calculated from total yield less both external defects and undersize tubers (smaller than 1 7/8 inches).

Percent marketable yield represents the percentage that each entry's marketable yield is of that of a specific standard variety.

Size distribution percentage is the weight of a specific size category divided by total yield (including defects).

Specific gravity was determined by potato hydrometer.

Vine maturity ratings were on the nine point scale:

- 1 = all plants completely dead (very early maturity)
- 9 = all plants full green (very late maturity)

Tuber shape was rated using the # assignments: 1. round; 2. mostly round; 3. rd. to obl.; 4. mostly obl.; 5. oblong; 6. obl. to long; 7. mostly long; 8. long; and 9. cylindrical.

Tuber appearance was subjectively evaluated using the scale:

- 1 = extremely rough or otherwise unattractive
- 9 = very uniform and attractive

Upstate New York Table 1. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for early maturity trial grown at Freeville, New York - 1989.

Variety/Clone	Total Yield cwt/A	Marketable Yield percentage of std.	Size Distribution by Class (%) ¹				Size Distribution(%) 1-7/8 to 4 in. 2-1/2 to 4 in. Spec. Grav.				
			1	2	3	4					
AF879-3	289	233	80	17	37	44	2	0	83	47	98
Atlantic	384	331	113	12	28	53	6	0	88	59	102
B0257-3	340	291	99	13	34	50	3	0	87	53	99
Chaleur	240	220	75	8	25	58	9	0	92	67	77
CS7639-1	322	281	96	9	20	59	12	0	91	71	81
F70021	310	250	85	16	36	42	5	0	84	47	83
LaRouge	381	341	116	9	26	56	9	0	91	65	81
Monona	274	240	82	12	27	55	7	0	88	62	81
Norchip	311	251	86	16	44	38	2	0	84	40	91
Red Gold	297	235	80	21	35	40	4	0	79	44	88
Superior (std)	335	293	100	11	38	46	5	1	88	50	92
Yukon Gold	363	340	116	5	22	62	10	0	95	72	92
Walter-Duncan LSD (k=100)	36	35							2		
C.V. (%)	(9)	(9)							(2)		

¹Size classes: 1 = 1-1/2 to 1-7/8"; 2 = 1-7/8 to 2-1/2"; 3 = 2-1/2 to 3-1/4"; 4 = 3-1/4 to 4"; 5 = over 4".

Plant date: May 1 Vine-kill date (mowed): August 15 Harvest date: August 16

Upstate New York Table 2. Plant maturity, tuber shape and appearance, external and internal tuber defects for early maturity trial grown at Freeville, New York - 1989.

Variety/Clone	Plant ¹ Mat. at Vinekill	Tuber Data ¹ Shape Appear.	External Tuber Defects (%)				Int. Tuber Defects (%) ²				
			Total	Sun- burn	Mis- shapen	Growth Cracks	Rot	Hollow	Vasc. Heart	Disc.	Nec.
AF879-3	6.5	2.0	6.0	2.8	1.0	0.6	0.7	0.5	0.0	5.0	0.0
Atlantic	8.0	1.0	5.5	1.3	0.5	0.0	0.1	0.7	5.0	0.0	0.0
B0257-3	6.8	2.0	6.5	1.4	1.1	0.3	0.0	0.1	0.0	2.5	12.5
Chaleur	5.8	2.3	7.8	0.4	0.2	0.2	0.0	0.0	0.0	2.5	0.0
CS7639-1	7.5	2.0	4.5	3.5	1.5	0.8	0.8	0.5	0.0	0.0	2.5
F70021	5.8	2.0	5.5	2.9	1.1	0.6	0.4	0.9	0.0	0.0	2.5
LaRouge	6.5	2.0	6.8	1.1	0.0	0.2	0.3	0.6	7.5	0.0	7.5
Monona	7.5	2.0	5.0	0.8	0.6	0.1	0.0	0.0	0.0	0.0	7.5
Norchip	7.3	2.0	4.0	4.0	0.2	3.6	0.0	0.2	0.0	0.0	0.0
Red Gold	5.0	2.0	4.0	0.5	0.0	0.5	0.0	0.0	0.0	0.0	10.0
Superior (std)	5.0	2.0	5.0	0.7	0.2	0.3	0.1	0.0	2.5	0.0	7.5
Yukon Gold	5.5	2.0	8.0	0.7	0.1	0.5	0.1	0.0	0.0	0.0	0.0

¹See table headings explanation section in Summary text for this report.

²Based on a 10-tuber sample from each of 4 replications. The tubers were taken from size categories 3 and 4.

Upstate New York Table 3. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for medium maturity trial grown at Freeville, New York - 1989.

Variety/Clone	Total Yield cwt/A	Marketable Yield cwt/A	Size Distribution by Class (%) ¹					Size Distribution (%) 1-7/8 to 4 in. to 4 in. 2-1/2 Spec. Grav.
			percentage of std.	1	2	3	4	
AF875-15	319	258	84	11	28	52	8	1
AF875-16	335	304	98	6	27	60	7	0
AF875-17	311	279	90	8	29	58	5	0
Atlantic (std)	338	309	100	6	19	57	18	1
B0242-3	307	262	85	11	28	51	8	1
B9955-46	347	323	105	4	17	56	22	1
Coastal Chipper (B9792-157)	346	315	102	8	25	56	11	1
F77087	319	293	95	6	19	64	11	1
Katahdin	333	306	99	7	20	61	12	0
Monona	299	266	86	10	32	53	5	0
Saginaw Gold	305	252	82	13	41	41	4	0
Sangre	350	309	100	11	27	55	7	0
Waller-Duncan LSD (k=100)	58	55						

C.V. (%) (9) (11) (1)

¹Size classes: 1 = 1-1/2 to 1-7/8"; 2 = 1-7/8 to 2-1/2"; 3 = 2-1/2 to 3-1/4"; 4 = 3-1/4 to 4"; 5 = over 4".

Plant date: May 1 Vine-kill date: August 18 Harvest date: September 1

Upstate New York Table 4. Plant maturity, tuber shape and appearance, external and internal tuber defects for medium maturity trial grown at Freeville, New York - 1989.

Variety/Clone	Plant ¹ Mat. at Vinekill	Tuber Data ¹ Shape Appear.	External Tuber Defects (%)			Int. Tuber Defects (%) ²		
			Total	Sun- burn	Miss- shapen	Growth Cracks	Rot	Holl. Heart
AF875-15	3.5	2.0	4.0	7.0	1.8	0.2	4.7	0.3
AF875-16	5.8	2.0	5.3	3.0	1.0	0.6	1.0	0.4
AF875-17	6.5	2.0	4.5	2.0	1.4	0.5	0.0	0.1
Atlantic (std)	8.0	1.0	7.0	2.3	1.2	0.4	0.5	0.2
B0242-3	4.5	3.0	3.8	2.0	0.6	1.3	0.1	0.0
B9955-46	7.0	2.0	4.3	1.9	0.7	0.0	0.0	1.2
Coastal Chipper (B9792-157)	5.5	2.0	3.0	1.1	0.8	0.2	0.0	0.2
F77087	7.8	1.5	6.5	1.9	1.6	0.1	0.0	0.2
Katahdin	7.8	2.0	5.3	1.4	1.4	0.0	0.0	0.0
Monona	7.0	2.0	4.0	0.9	0.6	0.2	0.0	0.1
Saginaw Gold	4.0	2.0	5.3	5.2	2.1	1.9	0.1	1.1
Sangre	6.8	2.0	6.5	0.7	0.0	0.6	0.1	0.0

¹See table headings explanation section in Summary text for this report.

²Based on a 10-tuber sample from each of 4 replications. The tubers were taken from size categories 3 and 4.

Upstate New York Table 5. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for medium-late maturity trial grown at Freeville, New York - 1989.

Variety/Clone	Total Yield cwt/A	Marketable Yield cwt/A	Size Distribution by Class (%) ¹					Size Distribution (%) 1-7/8 to 4 in. 2-1/2 to 4 in. Spec. Grav.
			1	2	3	4	5	
AF828-5	413	373	120	8	19	59	14	1
AF1060-2	445	394	127	9	23	60	8	0
Atlantic	377	311	100	8	26	50	13	3
B0034-10	203	152	49	22	50	27	0	0
B0240-11	333	273	88	12	31	49	7	0
B0241-8	389	338	109	8	19	54	19	1
B0242-2	293	246	79	13	27	54	6	0
B0386-6	284	229	74	15	39	42	4	0
B0397-2	263	215	69	15	41	42	1	0
B9792-158	340	279	90	15	36	46	3	0
Kanona	305	283	91	6	19	66	10	0
Katahdin (std)	348	311	100	5	15	60	18	1
Kennebec	387	318	102	6	15	59	18	3
LA01-38	379	342	110	5	15	58	21	1
Monona	320	288	93	7	24	57	12	0
Somerset	331	260	84	6	15	54	21	4
WF31-4	316	262	84	12	28	52	8	1

Waller-Duncan LSD (k=100)	38	38	2
C.V. (%)	(9)	(10)	(2)

¹Size classes: 1 = 1-1/2 to 1-7/8"; 2 = 1-7/8 to 2-1/2"; 3 = 2-1/2 to 3-1/4"; 4 = 3-1/4 to 4"; 5 = over 4".

Plant date: May 4 Vine-kill date: August 23 Harvest date: September 6

Upstate New York Table 6. Plant maturity, tuber shape and appearance, external and internal tuber defects for medium-late maturity trial grown at Freeville, New York - 1989.

Variety/Clone	Plant ¹ Mat. at Vinekill	Tuber Data ¹		External Tuber Defects (%) ²				Int. Tuber Defects (%) ²			
		Shape	Appear.	Total	Sun- burn	Mis- shapen	Growth Cracks	Rot	Heart Disc.	Hollow Vasc.	Int. Nec.
AF828-5	7.5	2.0	8.0	1.1	0.8	0.0	0.0	0.3	0.0	2.5	2.5
AF1060-2	7.5	1.0	7.0	1.6	1.1	0.1	0.0	0.4	0.0	5.0	0.0
Atlantic	6.5	1.0	6.0	6.2	2.1	1.9	1.5	0.7	2.5	0.0	0.0
B0034-10	4.8	3.0	3.0	1.5	0.7	0.6	0.0	0.3	15.0	2.5	2.5
B0240-11	5.8	1.0	4.3	6.0	3.9	0.6	0.5	1.1	30.0	2.5	0.0
B0241-8	5.8	1.0	4.8	4.3	1.6	0.1	1.3	1.2	32.5	0.0	2.5
B0242-2	2.7	3.0	4.3	3.1	0.8	0.5	0.2	1.6	0.0	0.0	3.3
B0386-6	2.5	1.0	5.5	3.6	1.4	1.1	0.6	0.4	0.0	0.0	0.0
B0397-2	5.3	2.0	3.8	3.5	0.4	2.2	0.0	0.8	2.5	2.5	17.5
B9792-158	5.5	2.8	4.5	3.5	2.0	1.4	0.0	0.1	2.5	10.0	0.0
Kanona	6.0	2.0	7.0	1.7	0.7	0.3	0.0	0.8	0.0	2.5	0.0
Katahdin (std)	7.8	2.0	5.0	4.4	3.9	0.2	0.0	0.3	0.0	0.0	0.0
Kennebec	6.8	4.0	3.5	9.7	5.9	1.0	2.4	0.3	0.0	2.5	5.0
LA01-38	6.0	3.0	7.0	3.1	2.0	0.1	0.2	0.8	0.0	0.0	0.0
Monona	7.0	1.0	5.5	2.5	2.1	0.1	0.1	0.1	0.0	5.0	12.5
Somerset	7.0	3.0	7.0	10.6	8.7	1.4	0.6	0.0	2.5	0.0	0.0
WF31-4	4.8	1.0	4.0	5.0	0.2	1.2	0.3	3.3	10.0	0.0	0.0

¹See table headings explanation section in Summary text for this report.

²Based on a 10-tuber sample from each of 4 replications. The tubers were taken from size categories 3 and 4.

Upstate New York Table 7. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for late maturity trial grown at Freeville, New York - 1989.

Variety/Clone	Total Yield cwt/A	Marketable Yield cwt/A	Size Distribution by Class (%) ¹					Size Distribution (%) 1-7/8 to 4 in. 2-1/2 to 4 in. Spec. Grav.
			1	2	3	4	5	
Allegany (NY72)	321	283	100	4	15	59	20	2
Atlantic	359	313	110	8	23	57	12	0
B0172-15	356	315	111	5	15	62	16	3
B0172-22	338	291	102	8	24	58	10	0
B7592-1	384	326	115	6	19	52	18	5
B9792-2B	276	236	83	11	30	56	3	0
B9792-8B	375	320	113	8	30	53	9	0
Elba	360	304	107	5	16	55	20	5
Katahdin (std)	332	284	100	6	21	56	13	4
Monona	310	277	97	6	25	56	11	2
NY78	316	285	100	9	31	58	2	0
Steuben (NY81)	396	346	122	4	13	53	28	3
Waller-Duncan LSD (k=100)	50	48					93	80
C.V. (%)	(10)	(10)					(2)	(2)

¹Size classes: 1 = 1-1/2 to 1-7/8"; 2 = 1-7/8 to 2-1/2"; 3 = 2-1/2 to 3-1/4"; 4 = 3-1/4 to 4"; 5 = over 4".

Plant date: May 4 Vine-kill date: September 1 Harvest dates: September 14, 21

Upstate New York Table 8. Plant maturity, tuber shape and appearance, external and internal tuber defects for late maturity trial grown at Freeville, New York - 1989.

Variety/Clone	Plant ¹ Mat. at Vinekill	Tuber Data ¹			External Tuber Defects (%)				Int. Tuber Defects (%) ²			
		Shape	Appear.	Total	Sun- burn	Mis- shapen	Growth Cracks	Rot	Holl. Heart	Vasc. Disc.	Int. Nec.	
Allegany (NY72)	5.3	1.0	5.0	5.6	2.2	1.2	0.8	1.4	0.0	2.5	0.0	
Atlantic	3.3	2.0	6.0	4.8	1.9	1.2	0.2	1.4	10.0	0.0	0.0	
B0172-15	6.8	3.0	3.8	4.2	0.0	3.2	0.4	0.6	32.5	0.0	0.0	
B0172-22	3.3	2.0	6.0	6.1	0.9	0.2	4.3	0.7	36.7	3.3	3.3	
B7592-1	4.8	3.0	4.8	4.4	0.7	2.1	0.2	1.4	0.0	0.0	0.0	
B9792-2B	3.8	2.0	5.0	3.4	0.9	0.4	1.3	0.9	2.5	2.5	0.0	
B9792-8B	6.0	2.0	4.0	6.5	2.1	1.8	1.9	0.8	40.0	2.5	0.0	
Elba	6.8	1.0	5.3	6.2	2.3	0.6	3.3	0.1	0.0	5.0	0.0	
Katahdin (std)	6.8	2.0	5.0	4.3	2.7	0.5	0.6	0.5	5.0	2.5	2.5	
Monona	4.8	2.0	4.0	3.2	1.7	0.4	0.0	1.1	0.0	0.0	15.0	
NY78	6.3	1.0	7.5	0.7	0.6	0.0	0.1	0.0	2.5	2.5	0.0	
Steuben (NY81)	6.5	1.0	6.3	4.9	3.0	0.0	0.5	1.3	2.5	0.0	5.0	

¹See table headings explanation section in Summary text for this report.

²Based on a 10-tuber sample from each of 4 replications. The tubers were taken from size categories 3 and 4.

Upstate New York Table 9. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for russet variety trial grown at Freeville, New York - 1989.

Variety/Clone	Total Yield cwt/A	Marketable Yield percentage cwt/A of std.	Size Distribution by Class (%) ¹					Size Distribution(%) 4 to 12 oz. >8 oz.	Spec. Grav.
			1	2	3	4	5		
A7411-2	343	210	144	36	51	11	3	0	62
A74114-4	339	160	110	40	46	11	1	2	57
B0036-6	325	189	129	26	49	18	3	5	69
B0045-6	332	163	111	50	45	4	2	0	49
B0309-11	241	166	113	28	48	22	1	0	72
B0319-26	280	129	88	46	46	6	1	1	53
B0326-20	285	127	87	44	50	4	2	0	56
B0329-10	294	147	101	41	51	7	1	0	59
B0493-8	411	318	217	13	50	25	10	2	84
B9922-11	325	215	147	32	55	11	2	0	68
Coastal Russet	302	210	144	26	61	12	1	0	73
F143-1	370	246	169	27	53	15	4	1	72
High Lat Russet	304	122	83	51	47	3	0	0	49
Hi-Lite Russet	356	167	115	48	43	8	0	0	52
Russet Burbank (std)	343	146	100	46	49	5	0	0	54
Russet Norkotah	334	152	104	52	43	4	0	0	48
Waller-Duncan LSD (k=100)	52	39						5	
C.V. (%)	(9)	(14)						(3)	

¹Size classes: 1 = less than 4oz; 2 = 4 to 8oz; 3 = 8 to 12oz; 4 = 12 to 16oz; 5 = greater than 16oz.

Plant date: May 5

Vine-kill date: September 7

Harvest date: October 12

Upstate New York Table 10. Plant maturity, tuber shape and appearance, external and internal tuber defects for russet variety trial grown at Freeville, New York - 1989.

Variety/Clone	Plant ¹ Mat. at Vinekill	Tuber Data ¹ Shape Appear.	External Tuber Defects (%)				Int. Tuber Defects (%) ²			
			Total	Sun- burn	Mis- shapen	Cracks	Rot	Heart Disc.	Holl. Vasc.	Heart Disc.
A7411-2	4.3	7.0	5.7	3.4	1.8	0.2	0.3	3.3	3.3	0.0
A74114-4	1.0	5.7	4.7	10.7	9.5	1.1	0.1	0.0	3.3	3.3
B0036-6	1.0	3.0	4.5	11.6	9.9	1.7	0.0	0.0	0.0	0.0
B0045-6	1.0	3.0	4.3	1.7	1.1	0.0	0.6	0.0	3.3	0.0
B0309-11	1.0	4.3	7.3	3.4	1.2	1.5	0.0	0.7	6.7	13.3
B0319-26	1.3	6.0	4.3	6.9	4.6	2.0	0.0	0.3	6.7	0.0
B0326-20	1.0	6.0	4.3	11.0	8.5	2.1	0.4	0.0	0.0	3.3
B0329-10	1.0	6.0	4.3	9.1	7.5	0.4	0.9	0.2	10.0	0.0
B0493-8	2.0	3.0	4.3	7.1	2.8	2.7	0.6	1.0	0.0	0.0
B9922-11	1.0	4.0	6.0	1.6	0.3	0.7	0.7	0.0	25.0	0.0
Coastal Russet	3.0	7.0	5.0	4.6	2.1	2.2	0.0	0.3	0.0	0.0
F143-1	2.0	3.0	7.0	5.8	4.5	0.9	0.2	0.2	0.0	3.3
High Lat Russet	1.0	3.0	3.7	9.2	4.9	1.3	3.0	0.0	0.0	6.7
Hi-Lite Russet	1.0	6.0	3.3	4.6	3.8	0.6	0.0	0.2	6.7	0.0
Russet Burbank (std)	4.3	6.0	3.0	10.7	1.3	9.0	0.4	0.0	3.3	0.0
Russet Norkotah	1.0	6.0	6.0	2.2	1.9	0.2	0.0	0.0	13.3	10.0

¹See table headings explanation section in Summary text for this report.

²Based on a 10-tuber sample from each of 3 replications. The tubers were taken from size categories 3 and 4.

Upstate New York Table 11. Yield, marketable yield, percentage of yield by grade size distribution, and specific gravity for the Cornell Advanced Clone trial grown at Freeville, New York - 1989

Variety/Clone	Total Yield cwt/A	Marketable Yield percentage cwt/A of std.	Size Distribution by Class (%) ¹					Size Distribution (%) 1-7/8 to 4 in., to 4 in. 2-1/2	Spec. Grav.
			1	2	3	4	5		
Allegany (NY72)	451	388	124	8	25	53	13	1	91
Atlantic	404	337	108	10	29	54	7	0	90
E11-45	368	303	97	14	38	45	3	1	85
E40-10	319	285	91	6	17	56	20	0	94
E55-27	336	259	83	18	38	41	3	0	82
E55-35	362	294	94	17	43	39	1	0	83
E55-44	372	336	107	8	32	54	6	1	92
E57-13	359	298	95	14	34	44	8	0	86
F12-5	236	201	64	6	12	57	22	2	92
F24-3	349	278	89	16	33	43	7	1	84
F24-6	331	292	93	9	27	55	9	0	91
F24-12	383	333	106	8	27	50	12	2	90
F25-1	323	268	86	12	33	45	10	0	88
F100-1	340	296	95	9	24	57	10	0	91
FG6-6	371	288	92	20	40	37	3	0	80
FG6-15	374	332	106	8	23	57	10	1	90
Kanona	342	307	98	6	23	61	10	0	94
Katahdin (std)	370	313	100	8	21	59	11	2	91
Monona	318	279	89	5	18	57	18	1	94
NY78	310	271	87	9	26	59	6	0	91
NY84 (D146-11)	396	332	106	13	31	50	5	1	87
NY85 (D195-24)	320	249	80	20	45	34	1	0	80
Purple 5	282	242	77	14	36	44	6	0	86
Steuben (NY81)	456	411	131	7	17	56	18	1	92
Walter-Duncan LSD (.05)		52	51						3
C.V. (%)		(11)	(12)						(2)

¹Size classes: 1 = 1-1/2 to 1-7/8"; 2 = 1-7/8 to 2-1/2"; 3 = 2-1/2 to 3-1/4"; 4 = 3-1/4 to 4"; 5 = over 4".

Plant date: May 5

Vine-kill date: August 31

Harvest date: September 22

Upstate New York Table 12. Plant maturity, tuber shape and appearance, external and internal tuber defects for the Cornell Advanced Clone trial grown at Freeville, New York - 1989.

Variety/Clone	Plant ¹ Mat. at Vinekill	Tuber Data ¹ Shape Appear.	External Tuber Defects (%)			Int. Tuber Defects (%) ²					
			Total	Sun- burn	Mis- shapen	Growth	Cracks	Rot	Holt. Heart	Vasc. Disc.	Int. Nec.
Allegany (NY72)	4.0	1.0	5.0	4.9	4.2	0.2	0.3	0.1	0.0	0.0	0.0
Atlantic	4.0	2.0	4.3	6.1	3.3	0.6	1.2	1.0	5.0	0.0	2.5
E11-45	3.0	2.8	6.0	3.1	1.6	0.3	0.0	1.2	2.5	5.0	0.0
E40-10	2.5	1.0	7.3	4.3	3.3	0.0	0.2	0.8	0.0	2.5	0.0
E55-27	1.3	1.5	5.0	4.8	1.0	0.3	1.8	1.7	0.0	0.0	2.5
E55-35	3.0	2.0	5.0	1.7	0.7	0.3	0.3	0.4	0.0	0.0	0.0
E55-44	1.3	1.0	6.8	1.4	0.3	0.1	0.1	0.8	2.5	0.0	0.0
E57-13	1.3	1.0	7.5	2.7	2.1	0.1	0.3	0.2	0.0	0.0	0.0
F12-5	3.3	2.0	4.5	7.2	5.1	0.0	0.8	1.3	0.0	2.5	0.0
F24-3	2.3	2.0	5.8	4.1	2.9	0.1	0.0	1.1	2.5	0.0	0.0
F24-6	1.5	3.0	6.0	3.1	1.0	0.0	1.0	1.2	10.0	0.0	2.5
F24-12	2.0	2.0	5.8	2.8	2.6	0.0	0.1	0.0	2.5	0.0	0.0
F25-1	1.3	1.0	6.3	5.3	4.2	0.4	0.0	0.7	0.0	7.5	0.0
F100-1	1.8	2.0	5.0	4.2	3.1	0.9	0.2	0.0	10.0	0.0	0.0
FG6-6	2.5	2.0	6.3	3.5	1.7	0.9	0.9	0.0	0.0	0.0	0.0
FG6-15	1.8	4.8	7.3	1.5	0.7	0.5	0.0	0.3	0.0	0.0	0.0
Kanona	1.5	2.0	4.8	4.0	2.8	0.3	0.4	0.5	0.0	0.0	0.0
Katahdin (std)	4.3	2.0	4.3	5.7	5.2	0.0	0.4	0.1	0.0	2.5	0.0
Monona	4.7	2.0	3.7	6.0	4.2	0.0	0.6	1.2	3.3	0.0	0.0
NY78	5.5	2.0	7.3	3.2	2.9	0.0	0.0	0.3	0.0	15.0	0.0
NY84 (D146-11)	2.0	2.0	6.0	2.9	0.4	1.0	0.5	1.0	0.0	2.5	0.0
NY85 (D195-24)	1.5	2.0	5.3	1.8	1.3	0.3	0.1	0.2	0.0	2.5	0.0
Purple 5	2.5	2.0	6.0	0.5	0.0	0.0	0.0	0.5	0.0	10.0	0.0
Steuben (NY81)	5.0	2.0	4.3	1.7	1.4	0.3	0.0	0.0	0.0	0.0	0.0

¹See table headings explanation section in Summary text for this report.

²Based on a 10-tuber sample from each of 4 replications. The tubers were taken from size categories 3 and 4.

Upstate New York Table 13. Yield, marketable yield, percentage of yield by grade size distribution, percentage defects and specific gravity for Steuben County mineral soil variety trial grown at Arkport, New York - 1989

Variety/Clone	Total Yield cwt/A	Marketable Yield pct. cwt/A of std.	Size Distribution (%) ¹			Percentage External ² Tuber Defects			Pct. Internal ³ Tuber Defects			Spec. Grav.
						S	K	G	R	H	V	
			1	2	3							
Allegany (NY72)	469	428	108	3	63	34	5	1	0	0	5	0
Atlantic	520	473	119	6	79	15	1	1	0	1	25	0
B7592-1	451	419	105	5	80	16	1	1	0	0	0	0
E11-45	485	446	112	7	83	10	1	1	0	0	0	0
E55-27	414	376	95	7	82	11	2	0	0	0	0	0
E55-35	420	373	94	11	88	1	0	0	1	0	5	10
E55-44	368	352	89	3	86	11	1	0	0	0	0	0
E57-13	378	339	85	7	85	8	3	0	0	0	5	0
F12-5	373	354	89	2	62	36	2	1	0	0	0	0
F24-3	431	400	101	6	76	18	2	0	0	0	10	0
F24-12	460	446	112	2	72	26	1	0	0	0	25	0
F25-1	326	289	73	7	83	10	5	0	0	0	0	0
F100-1	425	397	100	6	83	12	1	0	0	0	40	0
FG6-6	429	383	96	10	87	3	0	0	0	0	0	0
Kanona	492	449	113	4	70	26	4	0	1	0	5	0
Monona (std)	432	397	100	4	72	24	3	1	0	0	5	0
NY85 (D195-24)	345	299	75	12	86	2	1	0	0	0	0	0
Somerset	436	319	80	11	77	12	14	1	1	0	10	0
Steuben (NY81)	455	431	108	3	66	31	1	0	1	1	0	0
Waller Duncan LSD (.05)			N.S.	N.S.								4
C.V. (%)		(13)	(14)									(2)

¹Size categories: 1 = <2"; 2 = 2 to 4"; 3 = >4".

²S = Sun-green; K = Knobby/Misshapen; G = Growth Crack; R = Rot.

³H = Hollow Heart; V = Vascular Discoloration; N = Internal Necrosis. Based on a 10-tuber sample per replication.

Plant date: May 25 Vine-kill dates: September 11 and 18 Harvest Date: September 25

Fertilizer: Banded 1500 lb/A 8-16-8 at planting. 130 lb/A ammonium nitrate side-dressed.

Vine-kill: Two applications each of Diquat 1 pt/A.

Upstate New York Table 14. Yield, marketable yield, percentage of yield by grade size distribution, percentage defects and specific gravity for Wyoming County mineral soil variety trial grown at Gainesville, New York - 1989

Variety/Clone	Total Yield cwt/A	Marketable Yield pct. cwt/A of std.	Size Distribution (%) ¹			Percentage External ² Tuber Defects			Pct. Internal ³ Tuber Defects			Spec. Grav.
			1	2	3	S	K	G	R	H	V	
Allegany (NY72)	409	304	158	6	89	5	16	1	0	0	0	87
Atlantic	411	320	166	6	92	2	14	2	0	0	20	5
B7592-1	316	260	135	9	87	4	7	2	0	0	0	90
E11-45	359	285	148	8	90	2	12	0	1	0	0	79
E55-27	248	208	108	12	88	0	4	1	0	0	0	94
E55-35	269	213	111	10	90	0	10	0	1	0	0	96
E55-44	207	169	88	10	90	0	7	1	1	0	0	88
E57-13	283	219	114	11	87	2	10	1	1	0	5	84
F12-5	260	224	116	6	85	9	7	2	0	0	0	93
Kanona	331	249	130	7	90	3	12	0	3	1	0	84
Monona (std)	239	192	100	8	89	3	7	2	0	0	0	81
NY85 (D195-24)	259	195	101	13	87	0	9	1	1	0	0	91
Steuben (NY81)	427	327	170	4	75	20	15	1	3	0	0	88
Waller-Duncan LSD (.05)		96	79							3		
C.V. (%)		(14)	(14)							(2)		

¹Size categories: 1 = <2"; 2 = 2 to 4"; 3 = >4".

²S = Sun-green; K = Knobby/Missshapen; G = Growth Crack; R = Rot.

³H = Hollow Heart; V = Vascular Discoloration; N = Internal Necrosis. Based on a 10-tuber sample per replication.

Plant date: May 31 Vine-kill date: September 22
 Fertilizer: Broadcast 400 lb/A 5-0-40. Banded 1500 lb/A 7-9-6.
 Vine-kill: Diquat 1 pt/A.

Harvest date: September 29

Upstate New York Table 15. Yield, marketable yield, percentage of yield by grade size distribution, percentage defects and specific gravity for Wayne County muck soil variety trial grown at Savannah, New York - 1989

Variety/Clone	Class	Total Yield cwt/A	Marketable Yield pct. cwt/A of std.	Size Distribution (%) ¹					Percentage External ² Tuber Defects					Pct. Internal ³ Tuber Defects			Spec. Grav.	
														S		H		
				1	2	3	4	5	S	K	G	R	H	V	N			
Allegany (NY72)	Whi	450	328	164	6	92	2	-	14	5	3	0	0	0	0	0	75	
Whi	462	382	191	7	92	1	-	-	7	3	1	0	27	0	0	0	85	
Rus	288	197	99	18	44	24	11	4	2	7	0	0	7	0	0	0	82	
A7411-4	Rus	416	285	142	17	45	23	10	5	3	5	2	0	13	7	0	72	
Whi	373	289	145	10	87	4	-	-	11	3	0	0	0	0	0	0	75	
Whi	361	287	144	6	87	9	-	-	5	2	5	0	3	0	0	0	72	
E11-45	Whi	314	251	126	14	87	0	-	6	0	1	0	0	0	0	0	63	
Whi	288	201	101	7	93	0	-	-	19	0	3	0	0	0	0	0	60	
Whi	350	237	119	20	80	0	-	-	9	3	1	0	0	0	0	0	84	
E55-35	Whi	305	205	103	27	73	0	-	5	1	1	0	0	0	0	0	81	
Whi	458	339	169	11	89	1	-	-	11	1	1	0	0	0	0	0	81	
Whi	388	307	153	8	92	0	-	-	13	0	0	0	10	0	0	0	75	
F12-5	Whi	236	180	90	13	87	0	-	-	7	1	3	0	3	0	0	82	
Whi	288	207	104	13	85	1	-	-	13	1	2	0	10	0	0	0	71	
Whi	284	233	117	12	87	1	-	-	7	0	0	0	5	0	0	0	82	
F143-1	Rus	264	196	98	21	47	7	2	3	1	0	0	0	0	0	0	72	
Rus	100	21	11	52	40	7	0	13	12	1	1	0	0	0	0	0	65	
Rus	336	254	127	12	42	21	18	7	1	3	0	1	13	0	0	0	71	
Kanona	Whi	352	290	145	8	89	3	-	-	9	0	1	1	0	0	0	75	
Katahdin (std)	Whi	297	200	100	7	86	7	-	-	22	3	3	0	0	0	0	70	
LaRouge	Red	361	294	147	9	91	0	-	-	7	2	2	0	0	0	0	70	
LA01-38	Whi	391	334	167	6	91	3	-	-	7	1	1	0	3	0	0	81	
Monona	Whi	310	250	125	9	89	3	-	-	10	0	0	0	3	0	0	67	
NY78	Whi	259	205	102	13	87	0	-	-	8	0	0	0	0	0	0	65	

(Continued...)

Upstate New York Table 15. - (continued) - Yield, marketable yield, percentage of yield by grade size distribution, percentage defects and specific gravity for Wayne County muck soil variety trial grown at Savannah, New York - 1989

Variety/Clone	Class	Total Yield cwt/A	Marketable Yield pct. cwt/A of std.	Size Distribution (%) ¹					Percentage External ² Tuber Defects					Pct. Internal ³ Tuber Defects		
									S	K	G	R	S	H	V	N
				1	2	3	4	5								
NY84 (D146-11)	Whi	275	211	105	12	88	0	-	10	0	1	0	0	0	0	61
NY85 (D195-24)	Whi	201	123	62	30	70	0	-	9	1	1	0	0	0	0	79
Reddale	Red	328	270	135	5	85	10	-	10	1	2	2	3	0	0	63
Red Gold	Red	224	132	66	25	76	0	-	14	0	2	0	0	0	0	75
Russet Norkotah	Rus	366	278	139	10	38	31	12	10	0	4	0	0	13	0	68
Sangre	Red	288	218	109	17	82	1	-	2	1	1	4	0	0	0	76
Steuben (NY81)	Whi	502	394	197	5	92	3	-	12	1	5	0	3	0	3	81
Yukon Gold	Whi	420	359	180	4	88	8	-	8	1	2	0	47	0	0	82
Walter-Duncan																
LSD (.05)		95	90													3
C.V. (%)		(18)	(23)													(3)

¹Size categories: Whites and Reds - 1 = <2"; 2 = 2 to 4"; 3 = >4".

Russets - 1 = <4 oz.; 2 = 4 to 8 oz.; 3 = 8 to 12 oz.; 4 = 12 to 16 oz.; 5 = >16 oz.

²S = Sun-green; K = Knobby/Misshapen; G = Growth Crack; R = Rot.

³H = Hollow Heart; V = Vascular Discoloration; N = Internal Necrosis. Based on a 10-tuber sample per replication.

Plant date: June 8
Fertilizer: Banded 1000 lb/A 10-6-7-8-23.6-2.2Mg. Sidedressed 300 lb/A 17-0-30.
Vine-kill: Diquat 1 pt/A.

Vine-kill date: September 12
Harvest date: October 4
Vine-kill date: September 12
Harvest date: October 4

NEW YORK

R.L. Plaisted, B.B. Brodie, Rose Loria, and W.M. Tingey

Early Generations: The crossing program produced 136 hybrid combinations. Twenty seven have chipping potential. Thirteen of these are neotuberosum hybrids. Eight are russet crosses and five are red crosses. Forty five are trichome population crosses. The remainder are other disease resistant crosses.

Seeds produced in 1988 were sown and transplanted to styrofoam trays on Mt. Pleasant and the greenhouses. These produced 69,460 tubers. Approximately 56,000 have chipping potential. Of these 16,000 are neotuberosum hybrids. Another 3,600 are long russets and 600 are red. In these crosses, the round and non russet tubers and the white or pink tubers were discarded. There were 7,000 trichome seedling tubers and 900 *Globodera pallida*.

The seedling hill population consisted of 65,000 with chip potential, 5,000 russets, 400 reds, and 2,000 miscellaneous sorts. There were 15,650 single four-cut size tubers selected at harvest. These were reduced to 10,250 by washing and grading for surface defects, and then reduced to 5,826 by discarding those with internal defects and dark chip color based on test tape after 48° storage. Only 22 russet and 37 red single hill selections were made.

There were 9,655 second year observation-seed plots planted with the four-cut sized tubers selected in 1987. All of these crosses had chipping potential. At harvest 1,725 were saved. A four-cut sized tuber was stored at 50° until December when it was evaluated for reducing sugars and internal defects. Two pieces were planted for virus indexing in the greenhouse and two pieces were evaluated for resistance to the golden nematode. Three hundred forty seven survived these tests.

The 612 third year observation plots consisted of 529 with chipping potential and 81 russets, and 2 reds. From the chipping clones 158 were saved in the field but 110 were discarded later based on specific gravity and chip color.

Intermediate Generations: The fourth year cohort of selections started with 141 chipping clones. After evaluation for yield, specific gravity, appearance, chip color, and susceptibility to scab, 15 were saved. The latest generation of neotuberosum x tuberosum hybrid intercrosses is at this same stage of selection. Seventy three selections were grown and 10 were saved at harvest. These are resistant to PVX and PVY as well as the golden nematode.

The fifth year selections (G generations) started with 21 chipping clones and two russet clones. Three of the former and none of the latter survived the screening processes.

There were 18 clones in the sixth year of evaluation. Only four have been saved. F24-12 and FG6-15 have potential for both tablestock and chipping. F100-1 has excellent chip color and high gravity, but cooks too dark for tablestock use. F143-1 is an oblong russet. All are resistant to the golden nematode.

Advanced Generations: Since last year, the clone NY72 has been released as Allegany and NY81 as Steuben. NY78 has been grown in demonstration sized plots on several New York farms. It is an attractive, bright skinned, late season, tablestock variety. It is more resistant to scab than Katahdin, but less than Superior. Its yield was sporadic in 1989, so these trials will be repeated in 1990. NY84 (D146-11) is a midseason tablestock variety. It produces good yields of large size tubers. It has an attractive shape and very good scab resistance, but does not have the bright skin of NY78. E11-45 has potential for the mid to late season tablestock and chipstock markets. It produces a high yield of small to medium sized tubers with an attractive shape and a bright skin. The resistance to scab is similar to Norchip. It produces very good chip color from 48° or 45° with reconditioning, but the specific gravity is similar to Monona's. E55-27 is a midseason clone with potential for both tablestock and chipstock. The yield is comparable to Monona, but the tuber size is smaller. It has a scurfy skin and a scab resistance like that of Norchip. The specific gravity is like Norchip's. E55-35 is a late season chipper. It produces an acceptable yield, but tuber size is small. It has excellent scab resistance and high specific gravity. E55-44 may be useful for both the early tablestock and chipstock markets. The yields are acceptable compared to other early varieties and the specific gravity is better than most earlies. It has good chip color from the field. The scab susceptibility is comparable to Katahdin. E57-13 is one of the most promising clones for both tablestock and chipstock. It has an early to midseason maturity and yields of medium sized, bright skinned tubers are comparable to those of Monona. It has excellent scab resistance and chip color from 48° or 45° with reconditioning. This is the only clone that is susceptible to the golden nematode.

Germplasm Development: Neotuberosum. A study was just completed which compared two systems of utilizing unadapted germplasm. One was to select first for adaptation then produce hybrids with Tuberosum for variety selections (Preselection). The other was to cross the initial introductions with tuberosum, then select within the hybrids in succeeding generations (Nobilization). The former was subject to greater erosion of the initial diversity, but produced the higher yielding hybrids in later generations. In the neotuberosum population, two cycles prior to the present, the neotuberosum clones were hybridized with tuberosum. The first generation produced

better clones for selection than the progenies of these selections. Therefore, it now seems desirable to return to selection within the neotuberosum population and make new hybrids for selection purposes at each generation. Trichomes. This population progresses along two lines. One is to grow a hybrid population in two locations, one to select for tuber type and trichome attributes, the other to grow under conditions of severe Colorado potato beetle pressure, with the survivors screened for trichome attributes. The selections from each location are then intercrossed. The second system of crossing is a continuous "backcross" utilizing a somaclone which preserves the "B" trichome droplets in the backcross progenies. In the original Berthaultii-tuberosum hybrids, the droplets on the "B" trichomes disappear in any progenies with tuberosum, but reappear in intercrosses of these hybrids. The somaclone trait has persisted in two backcrosses. We now have clones which have trichome qualities approximately as good as the Berthaultii parents and produce tubers that can be harvested with a digger in the normal May to September growing season. We must now rid this population of clones with unacceptable levels of glycoalkaloids. *Globodera pallida*. Atlantic and Steuben were pollinated with a bulk of 21 clones selected in Peru for resistance to two races of *G. pallida* and in Ithaca for resistance to *G. rostochiensis*. From the 900 transplants, 290 were selected which had multiple number of tubers. Four of each clone were sent to CIP for screening against *G. pallida*, two will be screened for *G. rostochiensis* and the remaining tubers will be grown to maintain the clones until the nematode tests are complete.

NORTH CAROLINA

M. J. Wannamaker and W. W. Collins

Breeding Program:

In eastern North Carolina fifty-two clones were assessed for yield and quality traits for the first time in an augmented design trial. Fourteen clones were identified for preliminary replicated evaluation in 1990. Advanced selections from North Carolina, USDA, and other states were tested at five eastern locations. Single row plots 21' long, 42" between rows, and 9" between seed pieces were planted March 30 - April 13 using a randomized complete block design with four replications. Fertilization, pest, and weed control practices were in compliance with those recommended for commercial growers in the area. Plots were harvested 90-102 days after planting. Results are presented in North Carolina Tables 1-6. Appearance was measured using a 1-9 scale: 1= very poor, 3= poor, 5= fair, 7= good, 9= excellent. Maturity was also measured using a 1-9 scale: 1= very early, 3= early, 5= midseason, 7= late, 9= very late.

A trial was also planted on April 25 at one mountain location and harvested 117 days after planting. The design and layout of this trial were similar to those used in the eastern trials. Results are presented in North Carolina Table 7.

An average of 18.4 inches of rain fell during the potato growing season. This excessive rainfall resulted in uneven stands and tuber rot at harvest. With regard to clonal performance the USDA clone B9792-157 continued to perform well in the eastern trials. In the mountain trial New York clones NY72 and NY81 had marketable yields significantly higher than the standard, Kennebec. The North Carolina clone 73C26-1 consistently yielded well in the east. This clone was further tested on six additional eastern North Carolina farms in semi-commercial plantings. Chip color was unacceptable, but the high yield and superior shape and appearance make 73C26-1 potentially suited for the North Carolina tablestock market. Many of the USDA clones in the variety trials were being tested for the first time in North Carolina. Superior performers will be tested again in 1990.

Adaptation and Diploid Breeding:

Evaluation and maintenance of the adapted PHU-STN population was continued at the Mountain Horticultural Crops Research Station, Fletcher. Four separate and specific populations continued to be maintained in the diploid breeding material. These populations have been selected for 1) high dry matter, 2) resistance to Alternaria, 3) resistance to Erwinia, and 4) heat tolerance. Studies begun or continued in 1989 included 1) relationship of high dry matter and resistance to Erwinia, 2) study of genotypic, phenotypic, and environmental correlation between maturity and early blight (Alternaria) resistance, and 3) evaluation of level of heat tolerance in the populations.

NORTH CAROLINA Table 1. Potato Variety Trial at Bright Farm, Pasquotank County.

VARIETY	TOTAL YIELD CWT/A	CWT/A	MARKETABLE YIELD		APPEARANCE	CHIP COLOR ¹			SPECIFIC GRAVITY	MATURITY
			% OF ATLANTIC	CWT/A		1	2	3		
B9792-157	342.7	318.9	186	8	8	2	5	3	1.051	6
B9792-158	326.2	273.0	159	7	3	4	6	1.062	6	6
73C26-1	283.6	244.2	142	7	8	8	9	1.060	4	4
BO238-4	259.2	218.6	127	7	4	3	3	1.059	5	5
BO241-8	256.5	217.0	126	7	3	5	7	1.081	5	5
WF31-4	249.7	232.6	135	7	2	3	5	1.063	5	5
BO172-15	249.4	226.4	132	4	4	6	7	1.052	6	6
BO202-4	245.6	206.1	120	6	3	4	4	1.056	4.5	4.5
BO172-22	240.7	213.1	124	6	3	6	6	1.064	6	6
SUPERIOR	233.0	214.7	125	7	7	7	8	1.076	3.5	3.5
BO257-12	228.8	196.8	114	7	4	3	7	1.081	4.5	4.5
BO178-34	225.1	182.5	106	6	3	2	6	1.068	5	5
NEA219.70-3	220.0	188.2	109	9	3	6	6	1.051	4	4
82C21-1	210.5	166.5	97	7	4	3	8	1.065	4.5	4.5
E55-35	199.6	157.1	91	6	3	3	3	1.059	5	5
82C16-8	197.3	182.0	106	8	5	6	1.064	5	5	5
NY81	194.2	170.1	99	7	5	9	8	1.054	6	6
ATLANTIC	186.7	171.9	100	7	2	5	7	1.086	5	5
E57-13	182.5	160.2	93	7	3	4	4	1.056	5	5
82C23-1	182.0	147.8	86	7	2	3	3	1.049	5	5
E55-27	174.2	143.9	84	5	2	3	3	1.058	4	4
83C9-10	172.5	142.3	83	5	2	3	2	1.062	5.5	5.5
BO209-1	164.1	148.6	86	7.5	5	3	3	1.053	5	5
81C1-10	162.9	118.2	69	4	2	3	2	1.051	4.5	4.5
NY71	158.4	143.9	84	7	2	3	2	1.051	6	6
66AP11-53	150.9	87.1	51	4	2	3	2	1.046	6	6
SUNRISE	126.3	101.9	59	6	7	8	7	1.079	5	5
NORCHIP	115.0	82.5	48	5	5	6	3	1.053	4	4
BN9826-1	115.0	58.3	34	5	5	6	3	1.047	5	5
BN9805-2	103.8	79.3	46	4.5	4.5	5	5	1.054	7	7
81C37-2	88.8	59.1	34	5	5	5	4	1.055	4	4
76C29-7	61.6	40.4	23	4	4	4	4	1.052	6	6
LSD (.05)	47.9	50.6								
CV	17.2	20.9								
Overall Mean	197.1	165.2								

1/ Chip Color supplied by Wise Foods: 7/14/89, 7/19/89, & 7/26/89. 1=v. light, 5=acceptable, 9=v. dark.

NORTH CAROLINA Table 2. Potato Variety Trial at Cooper Farm, Tyrrell County.

VARIETY	TOTAL YIELD CWT/A	MARKETABLE YIELD		APPEARANCE	CHIP COLOR ¹			SPECIFIC GRAVITY	MATURITY
		CWT/A	% OF ATLANTIC		1	2	3		
BO608-3	337.5	290.7	148	6.5	7	7	9	1.060	4
73C26-1	320.3	248.1	126	6	9	8	9	1.064	4.5
LA01-38	302.0	266.1	135	5.5	5	8	9	1.067	6.5
76C29-7	292.1	248.9	127	7	3	4	6	1.061	4.5
82C25-19	286.7	261.2	133	7	4	4	4	1.074	4
E55-35	280.0	234.2	119	7	2	3	3	1.073	4
82C21-1	272.3	207.2	105	6.5	9	7	7	1.071	4.5
BO608-7	270.0	213.7	109	6.5	5	7	6	1.063	5
BO564-5	268.9	171.1	87	6.5	8	0	4	1.064	4
82C25-18	267.3	228.4	116	7	6	7	3	1.075	5
NY71	259.9	230.9	117	6	2	4	5	1.066	6
B9939-N16	257.9	190.0	97	7	8	9	9	1.063	4
NY81	255.3	225.2	115	6	7	9	9	1.046	5
BO595-4	237.0	183.4	93	4.5	9	9	9	1.074	5
ATLANTIC	236.6	196.5	100	7	5	5	3	1.071	5
81C1-10	235.5	194.9	99	7	6	4	6	1.071	5
B9792-158	228.9	181.8	93	6	5	0	3	1.069	5
E57-13	227.8	194.1	99	6	4	3	3	1.070	5
B9792-157	224.0	193.2	98	7	2	4	3	1.065	6
BN9826-1	218.8	180.9	92	6	9	9	9	1.061	6
E55-27	218.6	180.9	92	7	2	3	3	1.072	4
WF46-4	213.0	178.5	91	6.5	4	6	4	1.078	5
NEA219.70-3	204.5	175.2	89	6	6	6	6	1.064	5
66AP11-53	201.7	140.0	71	6	7	6	5	1.058	5
82C18-8	198.1	167.0	85	6.5	5	2	7	1.077	4.5
BO242-2	196.3	149.0	76	6	3	4	3	1.065	5
BO591-8	192.7	135.9	69	7	3	3	3	1.066	4
SUNRISE	191.9	153.9	78	6.5	3	7	6	1.061	3
SUPERIOR	187.8	159.7	81	6	5	8	8	1.065	4
BN9805-2	167.0	117.9	60	6	7	8	9	1.054	5
NORCHIP	162.3	135.1	69	7	5	4	7	1.068	5
82C2-3	154.4	86.0	44	6	8	7	6	1.066	4.5
LSD (.05)	65.6	67.2							
CV	19.8	25.0							
Overall Mean	236.5	191.2							

1/ Chip Color supplied by Wise Foods on: 7/13/89, 7/18/89, 7/26/89. 1=v. light, 5=acceptable, 9=v. dark.

NORTH CAROLINA Table 3. Potato Variety Trial at Davis Farm, Tyrrell County.

VARIETY	TOTAL YIELD CWT/A	CWT/A	MARKETABLE YIELD % OF ATLANTIC	APPEARANCE ¹	CHIP COLOR ²	SPECIFIC GRAVITY	MATURITY ³
73C26-1	259.1	217.0	120	7	6	1.053	4
B9792-61	241.2	207.2	115	7	2	1.057	5
66CP3(75)-1	211.9	167.8	93	6.5	8	1.041	5.5
NY71	207.2	178.5	99	7	8	1.054	5
LAU1-38	207.0	163.8	91	6	9	1.049	5
B9792-157	206.7	178.5	99	6	3	1.058	5
ATLANTIC	205.4	180.1	100	7	5	1.064	5
NY81	197.5	179.3	100	7	7	1.057	5
BO443-10	187.2	103.2	57	7	3	1.067	5
SUPERIOR	185.0	163.8	91	7	4	1.052	3
NORCHIP	144.6	122.8	68	7	3	1.059	3
B9792-158	131.8	94.2	52	7	4	1.057	4
ND860-2	129.0	89.2	50	5	4	1.057	5
SUNRISE	123.0	102.3	57	7	3	1.056	3
66AP11-53	105.6	75.3	42	6	7	1.045	5
83C9-10	41.3	33.6	19	5	6	1.062	6
LSD (.05)	51.2	49.1					
CV	20.7	24.4					
Overall Mean	174.0	141.0					

1/ Appearance: 1=very poor, 3=poor, 5=fair, 7=good, 9=excellent.

2/ Chip Color supplied by Wise Foods two days after harvest: 1=v. light, 5=acceptable, 9=v. dark.

3/ Maturing: 1=very early, 3=early, 5=midseason, 7=late, 9=very late.

NORTH CAROLINA Table 4. Potato Variety Trial at McCotter Farm, Pamlico County.

VARIETY	TOTAL YIELD CWT/A	MARKETABLE YIELD CWT/A			SPECIFIC GRAVITY	MATURITY ²
		% OF ATLANTIC	APPEARANCE ¹	SPECIFIC GRAVITY		
73C26-1	207.5	162.9	127	7	1.065	5
B9792-8B	206.8	151.5	118	6.5	1.067	6.5
B9792-157	202.4	158.4	123	6.5	1.063	7
LA01-38	201.4	176.0	137	6	1.066	6.5
NY81	200.3	166.2	129	7	1.061	5
82C23-1	195.0	116.3	90	6	1.077	5
76C29-7	187.6	135.4	105	6.5	1.058	4.5
BU595-1	177.8	109.7	85	5.5	1.056	4
66CP3(75)-1	177.5	119.5	93	5.5	1.050	6.5
AF875-16	175.7	137.6	107	7	1.078	5
81C1-10	175.1	135.9	106	6.5	1.068	6.5
BU566-5	174.7	126.6	100	7.5	1.070	4
NY71	174.1	140.0	109	7	1.063	6
SUPERIOR	173.6	149.8	116	6	1.064	4
BU642-6	172.4	80.2	62	5	1.059	5.5
82C63-13	171.1	122.8	95	6	1.055	5
BU610-6	171.0	107.3	83	6	1.060	5
o6AP11-53	170.8	107.3	83	5.5	1.055	7
BU601-1	164.9	106.4	83	5.5	1.067	5
E55-35	164.7	121.2	94	8	1.076	4
E55-27	163.6	107.3	83	7.5	1.072	4
ATLANTIC	156.6	128.6	100	7	1.072	5
B9792-158	155.4	108.1	84	6	1.060	6
E57-13	151.6	113.8	88	6.5	1.065	5
81C4-3	145.0	99.9	78	6.5	1.067	4
BN9805-2	143.3	102.3	80	5	1.061	6
NORCHIP	134.8	93.3	73	6	1.067	4
81C4-3	134.3	102.3	80	6.5	1.070	4.5
BU608-6	134.1	82.7	69	5	1.054	4.5
SUNRISE	126.7	88.4	68	5.5	1.064	5
NEA219-70-3	118.4	75.3	59	6.5	1.062	4
BN9820-1	84.5	47.5	37	6	1.058	4.5
LSD (.05)	40.3	38.5				
CV	17.3	22.7				
Overall Mean	165.2	118.7				

1/ Appearance: 1=very poor, 3=poor, 5=fair, 7=good, 9=excellent.

2/ Maturity: 1=very early, 3=early, 5=midseason, 7=late, 9=very late.

NORTH CAROLINA Table 5. Round White Trial (RWO-I) at Tidewater Experiment Station, Plymouth, N.C. 1989

VARIETY	TOTAL YIELD		MARKETABLE YIELD		APPEARANCE ¹	CHIP COLOR ²			SPECIFIC GRAVITY	MATURITY ³
	CWT/A	CWT/A	% OF ATLANTIC	CWT/A		1	2	3		
BO180-3b	277.4		176.5	170	6	9			1.067	4
BO440-27	252.7		84.3	80	4.0	9	Rot		1.060	4
BO176-24	244.5		185.0	177	7	8	Rot		1.071	5
BO191-5	241.0		170.3	162	7	7			1.064	5
BO180-24	237.3		116.3	111	7	7	Rot		1.070	4
BO179-17	235.8		178.5	170	7	6	Rot		1.073	4.5
BO179-19	235.5		158.8	152	6.5	7	Rot		1.081	5
BO174-16	231.6		160.5	153	7	6	Rot		1.075	5
BO240-11	230.4		152.3	145	6.5	3	6	J	1.063	5
BO174-11	227.9		200.6	191	7	6	Rot		1.068	5
BO233-1	226.8		162.9	155	7	5			1.066	5
BO242-3	225.8		176.0	168	5	5			1.066	5
BO179-18	223.5		148.2	141	6	7	Rot		1.070	4
BO203-21	223.0		161.3	154	7	8			1.058	4
BO179-6	217.1		136.7	130	6	6	Rot		1.083	5
BO174-19	213.2		145.7	139	6	7	Rot		1.071	4
BO174-7	212.7		149.8	143	6	6	Rot		1.070	5
BO544-1	204.4		167.0	159	7	6			1.067	3
BO207-9	198.1		92.5	88	6	8			1.064	3
BO179-5	195.2		135.1	129	7	4	6	3	1.081	4
BO200-36	187.7		74.5	71	6.5	3	3		1.071	4
BO239-29	170.3		63.9	61	6	6			1.074	5
BO473-6	168.3		49.9	48	7	7	Rot		1.062	3.5
ATLANTIC	131.8		104.8	100	5.5	8	Rot		1.074	6
LSD (.05)	27.3									
CV	8.9		19.4							
Overall Mean	217.2		139.7							

1/ Appearance: 1=very poor, 3=fair, 5=poor, 7=good, 9=excellent.

2/ Chip Color supplied by Wise Foods on: 7/11/89, 7/18/89, & 7/26/89. 1=v. light, 5=acceptable, 9=v. dark.

3/ Maturity: 1=very early, 3=early, 5=midseason, 7=late, 9=very late.

NORTH CAROLINA Table 6. Round White Trial (RWO-II) at Tidewater Experiment Station, Plymouth, N.C. 1989.

VARIETY	TOTAL YIELD CWT/A	MARKETABLE YIELD CWT/A	% OF ATLANTIC	APPEARANCE ¹	CHIP COLOR ²			SPECIFIC GRAVITY	MATURITY ³
					1	2	3		
B9988-7	244.0	195.7	239	5.5	7	6	7	1.065	4.5
B0048-9	237.3	126.9	155	5	4	6	7	1.060	5
B0178-30	227.9	180.9	221	6	6	7	1.070	5	
B0178-35	219.9	162.1	198	7	7			1.075	6
B0246-7	215.3	158.0	193	6	8			1.063	5
B9935-10	209.0	169.5	207	6.5	2	2		1.059	5
BU243-11	205.2	148.2	181	6	0			1.057	5
B0177-20	199.5	135.1	165	7	6			1.075	5
B0256-1	196.7	163.8	200	6.5	8			1.073	5
B0178-14	192.6	113.8	139	6	7			1.075	4.5
B0172-12	191.8	153.9	188	7	5			1.068	4
B0257-3	185.4	112.2	137	7	6			1.070	5
BU243-18	165.4	125.3	153	5.5	2	3	3	1.062	4
B0244-6	177.0	72.9	89	5	6			1.063	4
B0554-2	173.9	102.3	125	6	7			1.060	3
B0178-16	168.5	117.9	144	5	7			1.065	5
BU245-8	163.1	122.8	150	6.5	8			1.066	5
B0257-8	158.4	113.0	138	6	5			1.067	4
B0251-5	150.8	80.2	98	6	5			1.064	4
BU255-9	141.5	97.4	119	6.5	3	5	3	1.068	4
B9792-2B	129.7	77.8	95	6	3	6		1.068	5
B0034-10	128.5	47.5	58	6	3	2	2	1.080	5
B9955-10	122.8	63.9	78	6.5	1	1	1	1.066	3
ATLANTIC	109.2	81.9	100	5	9			1.067	6
LSD (.05)		36.1	31.5						
CV		14.2	18.3						
Overall Mean		180.6	121.8						

^{1/} Appearance: 1=very poor, 3=fair, 5=good, 7=excellent.^{2/} Chip Color supplied by Wise Foods on: 7/11/89, 7/18/89, & 7/26/89. 1=v. light, 5=middle, 9=v. dark.^{3/} Maturity: 1=very early, 3=early, 5=midseason, 7=late, 9=very late.

NORTH CAROLINA Table 7. Potato Variety Trial at Mountain Horticultural Crops Research Station, Fletcher, N.C.

VARIETY	TOTAL YIELD CWT/A	MARKETABLE YIELD CWT/A % OF KENNEBEC		APPEARANCE ¹	SPECIFIC GRAVITY	MATURITY ²
		CWT/A	% OF KENNEBEC			
NORCHIP	304.4	212.9	124	7	1.076	4
NY81	302.8	269.4	157	6	1.072	7
NY72	271.7	233.4	136	3	1.076	5
NYD147-9	256.8	221.9	130	6	1.068	6
82C63-13	256.6	121.2	71	3	1.067	3
ATLANTIC	255.3	227.6	133	8	1.089	5
SUNRISE	252.0	210.4	123	6	1.075	3
KENNEBEC	241.7	171.1	100	6	1.073	6
73C26-1	239.1	190.0	111	6	1.072	3
83C9-10	232.4	194.1	113	7	1.067	5
81C37-2	232.0	174.4	102	6	1.073	3
82C23-1	231.9	201.4	118	7	1.070	4
82C2-3	226.5	172.8	101	6	1.090	3
B9792-157	225.3	179.3	105	6	1.078	4
B9947-N24	217.6	180.1	105	5	1.072	6
B9792-158	211.4	157.2	92	7	1.078	5
AF875-16	208.8	163.8	96	6	1.077	5
82C16-8	208.6	189.1	111	7	1.067	4
SUPERIOR	193.9	167.8	98	8	1.077	3
KATAHDIN	192.1	162.9	95	7	1.070	5
82C25-18	189.8	160.5	94	6	1.079	3
81C26-1	169.5	135.9	79	7	1.075	4
NY71	135.3	109.7	64	7	1.064	4
LA01-38	129.9	111.4	65	5	1.079	7
LSD (.05)		58.0	59.1			
CV		18.3	23.3			
Overall Mean		224.4	179.9			

1/ Appearance: 1=very poor, 3=fair, 7=good, 9=excellent.
 2/ Maturity: 1=very early, 3=early, 5=midseason, 7=late, 9=very late.

NORTH DAKOTA POTATO BREEDING PROGRAM

R. H. Johansen, Bryce Farnsworth and Dean Peterson

Crossing and Seedling Production

During the winter and spring of 1989, 221 potato crosses were made in the greenhouse and approximately 46,000 seedlings were grown in the greenhouse during the summer. The potato greenhouses were remodeled during the summer so seedlings were planted in several other greenhouses on the campus. All seedling tubers were grown in artificial media. At the Langdon Experiment Station 49,000 seedlings were planted on May 10 and approximately 900 were harvested on September 12 and 13. Another dry year prevailed at Langdon but in spite of the drought it was possible to select seedling hills of fair to good size. Again, second and third size seedling tubers from the Idaho and Texas breeding program were planted at Grand Forks.

Advanced Selections

At Grand Forks and Absaraka 771 second year selections were planted and 160 were saved at harvest for further testing. Of the older material, 115 third year selections were planted and 15 were saved at harvest and from the fourth year and older selections 153 were planted and 124 saved at harvest. The Grand Forks plot was planted on May 16 and 17 and harvested on September 6 and 7. An increase plot was also planted at Casselton. Plots at Absaraka were harvested on September 25 and 27 and the Casselton plot was harvested on the 26th and 28th of September.

Promising Selections

The advanced selections that looked the most promising in trial were ND2224-5R, ND1618-13R, NDT9-1068-11R, ND1196-2R, ND1995-1, ND671-4Russ, ND1538-1Russ and ND2008-2. ND2224-5R is a medium maturing, high yielding red that has bright red skin color. This selection has only fair baking and boiling qualities and is somewhat susceptible to storage rots. Line ND1618-13R is a high yielding red with bright red skin color, however it only has a fair vine. Line NDT9-1068-11R is a North Dakota selection selected in Texas that always has had high yield, beautiful type and excellent red skin color. This selection is late in maturity. Skin on the tubers of NDT9-1068-11R will tear when becoming detached from the stolon or vine. This selection has been tested for several years, however its susceptibility to storage rots seems to be its greatest defect.

Line ND1995-1 is derived from a cross between Atlantic and ND860-2. This selection has high total solids and is an excellent chipper. Line ND671-4Russ has some tolerance to verticillium wilt and has excellent russetting, shape and type. It is presently being used by some processors as an early french fry cultivar. Line ND1538-1Russ is a promising russet selection that has hollow heart resistance, some tolerance to verticillium wilt and has excellent culinary qualities. The internal flesh of this selection is very white and it is quite comparable to Russet Burbank in french fry quality. Line ND2008-2 is a cross between ND860-2 and Crystal. It is a cold chipper and has good type.

Cultivar and Selection Trial

Trials were again planted in the Red River Valley with locations at Grand Forks and Park River. In these two trials, 28 entries were planted in the randomized block of four replications and twenty-five hills (Table 1). Ten entries were planted in similar trials at Williston and Minot, however the trial at Minot was lost due to the drought and hot weather.

The trial at Park River under the supervision of county agent Wayne Grinde was planted on May 10th and harvested on September 22. The Grand Forks trial was planted on May 16 and harvested on September 18th. Roger Hanson was in charge of general maintenance of the Grand Forks trial which was planted on the Potato Research Farm. Personnel from the Minot and Williston Agriculture Research Centers conducted their trials. The North Central Regional Potato Variety Trial was again planted at Grand Forks and will be summarized in another report. Planting and harvest dates of all trials are found in North Dakota Table 1.

Weatherwise, the 1989 season was almost a repeat of 1988 which was recorded as one of the hottest and driest seasons ever recorded. The only difference between the two seasons was that the 1989 season had a fair amount of moisture early in the season, and probably was not as hot. This was the weather pattern for the season in general throughout North Dakota, however at Grand Forks some timely rains occurred during certain parts of the season that resulted in fairly respectable yields that averaged 179 cwt. per acre for the trial (North Dakota Table 2). The average yield for the Park River trial was somewhat lower at 154 cwt. per acre.

The highest yielding entries grown in trial were the red selections ND2224-5R, ND1562-4R, ND1618-13R, NDT9-1068-11R and ND2225-1R. Several of these selections were also high yielding in the 1988 trial. The highest yielding russets were Norgold Russet, Russet Norkotah, ND671-4Russ and ND1538-1Russ. Cal-Ore and Russet Burbank were the lowest yielding entries in trial. Cal-Ore however had good type and shape. Of the white chipping selections, ND1995-1 and ND986-9 produced the highest yield. Line ND2008-2, which is a cross between Crystal and ND860-2, outyielded one of its parents, ND860-2.

The two white chipping selections, ND1995-1 and ND986-9, also had the highest total solids. Both averaged above 21 percent solids, which was higher than Norchip. Line ND1995-1 is from a cross between Atlantic and ND860-2. All of the high yielding reds had total solids comparable to Norland but much higher than Red Pontiac. Average total solids at both locations were very comparable (North Dakota Table 2).

In the advanced selection and cultivar trial, ND2471-8 had the highest U.S. No. 1 yield per acre and also the highest total solids (North Dakota Table 3). This selection is a cross between Yankee Chipper and ND860-2 and is a good chipping selection. One of the most promising russets in this trial was ND2667-9Russ which is from a cross between ND967-1Russ and Russet Norkotah. Line ND2050-1R, a cross between Viking and Redsen looked like a good red in trial.

The highest yielding entry in trial at Williston was Norgold Russet which had an average yield of 73 cwt. per acre. The average yield at Williston was only 54 cwt. per acre (North Dakota Table 4).

Processing Tests - Chipping

Agtron readings and percent chip yield are found in North Dakota Table 5. These data were obtained from the 1988 statewide potato variety trial. After harvest, the samples were stored at 38°F for approximately 2 1/2 months and then chipped immediately out of storage. The samples were then chipped every two weeks out of 65°F storage. The best chippers in these trials were ND2008-2, ND1725-4, ND1796-1, ND1995-1, ND2013-4, ND651-9 and ND860-2.

At the Potato Research Lab at East Grand Forks, Minnesota 85 second year selections were tested for chip quality. From this test, 29 selections had Agtron readings of 46-50 and 13 selections had Agtron readings above 50. These samples were all chipped out of 65°F storage.

In the third year selection test, six selections had Agtron readings of 46-50 and four selections had Agtron readings above 50 when chipped at 43°F. Several selections in both the third and fourth year selections had Agtron readings from 46-50 when chipped after reconditioning.

Processing Tests - French Fries and Flakes

Twenty-eight selections and check cultivars were tested for french fry color, texture and flavor by the Food and Nutrition Department from the College of Home Economics at NDSU (North Dakota Table 6). ND2605-6 and ND1215-1 had the highest average score for french fry quality. Line ND671-4Russ, Russet Norkotah and NorKing Russet had the best overall score of all the russets tested. Line ND1538-1Russ was quite similar to Russet Burbank. Norchip, NorKing Russet and Viking were the tops in the flake test.

Culinary Tests

Advanced selections and check cultivars grown in the 1988 statewide trials were tested for boiling and baking (North Dakota Table 7). NorKing Russet and ND1538-1Russ were two of the best bakers. Line ND1538-1Russ had exceptionally white flesh after both boiling and baking.

North Dakota Table 1. Spacing, fertilizer, soil type, planting and harvest dates of the 1988 North Dakota Potato Variety Trials.

<u>Location</u>	<u>Row</u>	<u>Plant</u>	<u>Fertilizer</u>	<u>Soil Types</u>	<u>Planting Date</u>	<u>Harvest Date</u>
---inches---						
Park River	38	12	57-21-0 @ 200#/A	Glyndon silt loam	5/10	9/22
Grand Forks	38	12	22-22-12 @ 400#/A	Bearden clay loam	5/16	9/18
Williston	36	16	None	Williams loam	5/23	9/21

North Dakota Table 2. U.S. No. 1 yield, percent U.S. No. 1 and percent total solids of varieties and selections grown in state-wide trials in North Dakota during 1989.

Variety or Selection	Grand Forks			Park River			Average		
	Cwt/A U.S.No 1 Yield	% U.S. No.1	Total Solids	Cwt/A U.S.No. 1 Yield	% U.S. No.1	Total Solids	Cwt/A U.S.No.1 Yield	% U.S. No.1	Total Solids
ND2224-5R	265	96	16.9	190	88	17.1	228	92	17.0
ND1562-4R	251	93	17.3	196	90	17.7	224	92	17.5
ND1618-13R	246	95	17.3	195	83	16.7	221	89	17.0
NDT9-1068-11R	244	94	18.2	198	81	18.4	221	88	18.3
ND2225-1R	220	90	16.7	220	83	19.0	220	87	17.9
Red Norland	256	95	18.0	145	84	17.1	201	90	17.6
Norgold Russet	173	84	18.6	194	79	18.8	184	81	18.7
ND1196-2R	224	94	18.0	141	79	17.5	182	87	17.8
ND1995-1	177	86	21.2	183	77	21.6	180	82	21.4
ND986-9	182	87	22.4	173	84	21.2	177	85	21.8
Russet Norkotah	197	88	19.2	155	67	18.6	176	77	18.9
Red Pontiac	183	85	15.8	168	71	15.8	176	78	15.8
ND1408-8R	195	92	17.3	149	76	18.2	172	84	17.8
ND671-4R	205	90	19.2	138	75	19.0	172	83	19.1
Norchip	174	78	20.1	163	71	19.9	169	75	20.1
ND1538-1R	169	77	18.8	168	70	19.2	168	74	19.0
ND651-9	179	90	19.9	143	74	19.7	161	82	19.8
ND1382-6R	175	86	18.6	142	72	18.6	158	79	18.6
ND1725-4	129	72	20.1	175	72	20.9	152	72	20.5
ND1871-3R	177	90	18.6	126	80	18.2	152	85	18.4
Norking Russet	114	71	18.8	177	76	19.9	145	74	19.4
ND2008-2	155	88	19.0	121	79	19.0	138	84	19.0
ND2141-4R	147	71	17.3	108	58	16.5	128	65	16.9
Shepody	141	74	19.0	111	51	19.2	126	63	19.1
ND860-2	118	85	19.9	130	75	20.1	124	80	20.0
ND2330-3	126	80	19.2	105	70	18.4	115	75	18.8
Cal-Ore	123	76	19.4	102	61	20.7	112	68	20.1
Russet Burbank	53	38	18.2	88	31	17.3	71	35	17.8
Average	178.5	83.8	18.7	153.7	73.5	18.4	166.2	78.8	18.6

North Dakota Table 3. Advanced Selections and Cultivar Trial Grown at Grand Forks, ND - 1989.

Selection or Cultivar	U.S. No. 1 Yield Cwt/A	% U.S. No.1	% Total Solids
ND2471-8	281	95	23.7
ND2417-6	184	79	20.7
Red Norland	183	93	17.1
ND2050-1R	182	88	19.2
Norgold Russet	176	79	18.6
ND1660-IB-13R	166	85	18.6
ND2642-8	157	69	21.6
ND1342-18	152	76	22.2
Norchip	136	65	21.4
ND1850-5Russ	130	74	19.7
ND2667-9Russ	120	73	18.4
ND2829-8Russ	112	67	20.5
ND2264-7R	109	75	19.4
ND2013-4	103	79	19.4
ND2139-7R	97	73	16.2
ND1725-13	93	52	20.9
ND2031-6	82	61	19.4
ND2405-18Russ	78	63	19.9
ND2319-8Russ	45	36	18.4
ND2062-19	26	34	19.2
Average	131	71	19.7

North Dakota Table 4. U.S. No. 1 yield, percent U.S. No. 1, percent total solids of selections and cultivars grown in trial at Williston, ND 1989.

Cultivar or Selection	Yield U.S. No. 1 Cwt/A	% U.S. No. 1	% Total Solids
Norgold Russet	73	92	21.4
Red Pontiac	67	98	18.8
Red Norland	61	96	20.5
ND2008-2	60	92	21.6
Norchip	54	72	20.9
ND2224-5R	52	95	21.6
ND671-4Russ	50	77	21.2
NDT9-1068-11R	46	91	20.1
Russet Norkotah	41	75	22.0
Russet Burbank	37	60	19.0
Average	54	85	20.7

Table 5. 1989 chip tests and percent yield of cultivars and selections grown in trial during 1988.

Cultivar or Selection	1st chipping ¹		2nd chipping ²		3rd chipping ³		Percent yield average 3 tests	
	0 weeks at 40° since harvest		2 weeks at recond. 65°F		4 weeks at recond. 65°F		Grand Forks	Park River
	Grand Forks	Park River	Grand Forks	Park River	Grand Forks	Park River	Grand Forks	Park River
Agtron Reading								
Kennebec	17	28	25	56	42	53	26.4	31.8
Norchip	28	45	36	52	50	55	29.4	35.8
Norgold Russet	15	20	20	41	27	42	27.6	33.8
NorKing Russet	24	28	37	37	41	54	31.8	33.5
Russet Burbank	22	22	17	38	29	47	29.1	34.3
Russet Norkotah	16	18	25	48	35	53	26.8	32.6
Shasta	22	25	37	49	31	52	32.9	33.1
Shepody	20	31	18	45	41	54	30.7	35.8
ND651-9	35	45	40	52	51	55	29.9	32.8
ND671-4Russ	24	46	32	53	46	49	29.6	34.0
ND860-2	43	50	44	54	54	52	30.4	34.3
ND1215-16	17	29	26	56	41	52	29.6	33.3
ND1538-1Russ	15	29	18	46	19	47	27.1	33.5
ND1725-4	32	50	49	58	49	48	31.1	34.7
ND2008-2	36	50	48	54	59	52	28.1	35.4
ND2109-7	27	49	42	59	49	52	30.3	36.0
ND986-9	18	--	38	--	49	--	33.5	--
ND1796-1	36	--	53	--	54	--	30.1	--
ND1859-3Y	28	--	48	--	42	--	32.8	--
ND1995-1	52	--	58	--	56	--	33.8	--
ND2013-4	50	--	47	--	56	--	31.7	--
ND2264-7	37	--	52	--	56	--	32.3	--
ND2330-3	38	--	49	--	54	--	33.0	
Average	28.3	35.3	37.3	49.9	44.8	51.1	31.6	34.0

Note: All samples were stored at 40°F from harvest until the first chip test on January 18. Samples were then reconditioned at 65°F until final chip test on February 13.

¹January 18th

²February 1st

³February 15th

North Dakota Table 6. Average Scores for French Fry and Flake Tests^{1/}.

Cultivar or Selection	Color	French Fries			Flakes			Ave. Score	Ranking
		Texture	Flavor	Ave. Score	Ranking	Color	Texture		
Kennebec	7.0	6.0	5.9	6.3	6	7.1	6.6	6.6	9
Hillite Russet	5.6	6.0	5.7	5.8	13	—	—	—	—
Norchip	—	—	—	—	—	7.8	7.4	7.7	1
Norking Russet	6.0	6.1	5.8	6.0	11	8.1	7.2	7.0	2
Shasta	5.5	5.5	5.4	5.5	16	—	—	—	—
Shepody	3.2	4.8	3.6	3.9	25	—	—	—	—
Russet Burbank	4.8	5.9	4.8	5.2	21	6.6	5.2	4.9	12
Russet Norkotah	5.9	6.7	6.0	6.2	9	7.2	6.9	6.6	6
Viking	5.4	6.5	6.3	6.1	10	—	—	—	—
ND651-9	7.9	6.6	6.5	7.0	3	7.8	7.3	7.0	7.4
ND671-4Russ	6.2	6.4	6.0	6.2	7	7.2	7.0	6.7	7.0
ND860-2	—	—	—	—	—	7.0	6.8	6.7	6.8
ND1215-1	8.1	6.8	6.9	7.3	2	7.3	6.9	6.7	7.0
ND1538-1Russ	5.2	5.7	5.0	5.3	20	7.9	6.4	5.9	6.7
ND1850-5Russ	6.8	6.7	6.3	6.6	5	—	—	—	—
ND1859-3Y	5.3	6.4	5.3	5.7	14	5.7	6.7	5.8	6.1
ND2000-8	5.1	5.1	5.2	5.1	22	—	—	—	—
ND2008-2	6.1	6.5	5.0	5.9	12	7.2	5.9	5.6	6.2
ND2047-2Russ	5.5	5.9	5.0	5.5	17	—	—	—	—
ND2047-12Russ	3.6	5.1	3.7	4.1	24	—	—	—	—
ND2141-4Russ	5.8	5.1	4.4	5.4	18	—	—	—	—
ND2207-8Russ	5.6	6.0	4.8	5.5	16	—	—	—	—
ND2356-3Russ	6.0	5.0	5.3	5.4	19	—	—	—	—
ND2405-18Russ	5.3	5.1	4.6	5.0	23	—	—	—	—
ND2605-6	8.4	7.0	6.5	7.3	1	—	—	—	—
ND2667-3Russ	6.2	5.7	5.0	5.6	15	—	—	—	—
ND2667-9Russ	7.3	6.4	6.4	6.7	4	—	—	—	—
NDT2-1947-5Russ	6.0	6.5	6.1	6.2	8	—	—	—	—

Rating Guide

7-9 — Good
 5-6 — Fair, but acceptable
 1-4 — Poor, not acceptable

^{1/} All french fries and flakes were tested three times, except Russet Burbank and Ore-Ida which were tested 19 times.

North Dakota Table 7. 1989 Cooking Tests of Cultivars and Selections Grown at Grand Forks and Park River,
North Dakota - 1988^{1/}

Cultivar or Selection	Sloughing ^{2/}	Meali-ness ^{3/}	Boiling				Baking			
			Color After Cooking 4/	Color After Cooking 5/	Flavor 6/	Mealiness	Color	Flavor		
Kennebec	8.0	6.8	10.0	10.0	6.8	6.8	9.8	7.3		
Norchip	8.8	6.1	9.8	8.5	5.9	6.6	9.8	6.8		
Norgold Russet	8.8	5.5	10.0	9.8	7.0	5.6	10.0	6.6		
Norking Russet	7.5	7.3	9.5	9.8	6.5	8.0	9.0	7.3		
Red Norland	9.0	5.5	9.5	8.0	6.0	6.5	10.0	7.3		
Red Pontiac	9.8	7.4	9.5	9.5	7.3	5.8	9.0	6.9		
Redsen	8.3	5.6	9.8	6.5	6.5	6.8	9.0	6.6		
Russet Burbank	8.5	6.8	9.8	8.0	6.8	6.4	9.3	6.0		
Russet Norkotah	7.5	6.4	9.3	9.8	6.3	6.1	9.3	7.4		
Shasta	9.5	6.5	9.8	9.0	6.4	7.6	9.8	7.0		
Shepody	7.0	6.6	9.8	9.5	6.1	7.3	10.0	7.1		
NDT9-1068-11R	9.3	4.9	9.8	9.3	6.5	5.6	10.0	7.5		
ND651-9	9.0	5.0	9.5	9.3	5.6	6.6	10.0	6.4		
ND671-4Russ	8.3	6.6	9.0	8.8	6.5	6.1	8.8	7.0		
ND860-2	8.8	5.1	8.3	3.5	5.8	6.6	8.8	6.0		
ND1196-2R	9.5	4.9	9.8	9.3	6.3	5.5	8.8	6.8		
ND1215-16	8.5	6.8	8.5	7.3	6.4	7.1	9.0	6.9		
ND1382-6R	8.8	4.5	10.0	8.8	6.5	6.0	10.0	6.9		
ND1408-8R	8.0	5.5	9.3	8.8	6.4	5.6	10.0	7.0		
ND1538-1Russ	8.0	6.6	10.0	9.5	6.8	7.3	10.0	7.1		
ND1618-13R	10.0	4.8	9.3	7.8	6.4	5.9	8.8	7.3		
ND1725-4	6.5	6.4	10.0	8.5	5.9	6.6	9.8	6.0		
ND1871-3R	9.5	5.0	9.5	8.3	5.9	5.8	9.3	7.8		
ND2008-2	8.5	5.5	8.8	6.8	4.6	6.6	9.3	6.6		
ND2109-7	6.0	7.0	9.3	8.5	6.3	7.8	9.8	6.9		
ND2224-5R	9.0	4.3	9.0	7.0	5.8	4.6	7.8	7.1		
ND2354-20R	10.0	4.9	9.3	8.8	6.1	6.3	8.5			

1/ Average of two locations (Grand Forks and Park River)

2/ Severe Sloughing - 1; No Sloughing - 10

3/ Not Mealy - 1; Very Dry and Mealy - 10

4/ Dark - 1; Very White - 10

5/ Dark - 1; Very White - 10

6/ Poor Flavor - 1; Excellent Flavor - 10

Ohio

M. A. Bennett, A. D. Bisges, E. M. Grassbaugh, D. M. Kelly, M. D. Kleinhenz, F. I. Lower, R. C. Rowe, K. L. Wiese and E. C. Wittmeyer.

INTRODUCTION: The purpose of the statewide variety trials is to test new varieties for the benefit of Ohio growers under various farm conditions. Cultural and pest control practices in each case are those used by the cooperating grower. Stand, vigor, plant characteristics, diseases, and maturity were recorded in the fields. At harvest the tubers were evaluated, weighed, and graded, with samples taken for chipping tests.

Thirteen cultivars were planted at each of five farms. These farms were selected to give different soil and climatic conditions. The cultivars were selected either because they looked promising in previous statewide trials, and in the observation trials on two cooperating farms or were selected from the cultivar plots at the Ohio Agricultural Research and Development Center (OARDC), Wooster.

Farm Locations: The five farms referred to in the introduction are as follows:

Farm 1 (M) - Michael Farms, Urbana, Ohio, Champaign County -- main plots plus russet plots.

Farm 2 (Th) - Thompson Farms, Hanoverton, Ohio, Columbiana County -- main plots plus observation plots.

Farm 3 (Mel) - Mellinger Farms (Crystal Springs Farm), Leetonia, Ohio, Columbiana County -- main plots plus observation plots.

Farm 4 (L) - Logan Farms, Mt. Gilead, Ohio, Morrow County -- main plots plus two additional entries.

Farm 5 (C) - Chase Farms, Defiance, Ohio, Defiance County -- main plots plus russet plots.

See Table 1 for summary of cultural practices followed on these cooperating farms -- planting dates, harvest dates, and related information.

Procedures: Thirteen cultivars were planted in three replicates on each of the five farms. In addition, seven additional cultivars were planted for observation in smaller triplicated plots on Farms 2 and 3. Also, six Russet cultivars were planted on Farms 1 and 5. Two other additional entries were likewise planted on Farm No. 4. In the main trials, eighty seed pieces were planted in each replicate and in the other trials fifty each were used.

The seed potatoes were cut and treated May 2-4. Planting within the next few days was expected. However, rains delayed all planting. All farm plots were harvested from Sept. 27 to Oct. 5, thus making the growing season rather short. The growers' planters were used by driving very slowly. The potatoes were harvested with old flat bed diggers then picked up and weighed. A representative 50 lb. sample was then graded with 10 tubers cut for internal defects. A sample of each cultivar from four farms was then taken to O.S.U. (Columbus) for chip tests.

Atlantic, Norchip and Katahdin were used for comparison in the Main trials, Superior and Kennebec in the Observation trials and Russet Norkotah in the Russet trials.

Weather and Growing Conditions

The last three winters were unusually warm and dry. The 1988 growing season was the hottest on record in Ohio. Rains began in late April of 1989 and after early May were almost continuous thru May and June. Planting was delayed in general and was often done when fields where too wet. Many seed pieces rotted with poor stands resulting. This often occurred on well-drained land where no such problem had ever before occurred.

On Farm 2, two-thirds of the replicates were completely lost on such land. Because of poor yields, potatoes from this farm were not graded. On Farm 3 one-third were lost. Some losses also occurred on Farms 1 & 5. On all farms except possibly Farm 4, more extreme differences were seen in both yield and grade in the replicates of many entries than has ever been observed in 27 years of field trials. Most of the lower yields and grades in the replicates of any one cultivar were unquestionably due to moisture and soil conditions rather than to characteristics of the entry. Extreme variations were frequently noted in one replicate of 20 to 30 feet of a row. In general all yields were low. What all of this means is that the results obtained in Ohio in 1989 may or may not be indicative of the capability of any one cultivar when a more normal season should be expected.

Field Observations

The average stand for all entries on four farms was 84%, one of the lowest on Ohio testing records (Table 3). The mean for the last 15 years is 89%. The mean stand for the Observation trials was 85% and for the Russet trials at Farm 5, 84%. Stand counts were not taken at Farm 1 because of wet conditions.

No plant disease of any kind worthy of mention was found on Farm 2 and 3.

The most severe problem was soil compaction and plant stress due to the wet season. A rainy May and June caused poor root system development. In some cases a week or two of dry weather in July and August injured the plants and reduced tuber growth.

Maturity records obtained in early September before the plants were chemically killed, were of little value due to the unusual environmental conditions already described. With late planting and with some rains in late August and early September, many early and medium-early plants were still green.

GRADES AND YIELDS

The major external tuber defects were misshapen, second growth, greening and growth cracks, with some scab on 3 of the 4 farms where the tubers were graded. In most cases the grades were not unusually low.

Total and U.S. No. 1 yields with other data are shown in Tables 5-7. The yields of many cultivars varied greatly from farm to farm. The average percent of U.S. No. 1 for all entries on the four farms graded was 84%.

Soil analyses of statewide trial plots - 1989

Test Results	Cooperating Farms ^z			
	1	3	4	5
pH	6.1	5.8	6.8	5.3
P (lb/A)	880	506	90	682
K (lb/A)	424	401	225	245
CA (lb/A)	4150	2790	4850	740
Mg (lb/A)	618	159	699	103
CEC (meg/100g)	16	12	15	5
Ca (% base sat.)	65	59	79	37
Mg (% base sat.)	16	6	19	9
K (% base sat.)	3.4	4.4	1.9	6.3
Zn (lb/A)	16.7	24.3	24.5	12.4
B (lb/A)	1.3	1.2	1.4	.7
OM (%)	2.6	2.4	3.1	.9

^z 1 - Michael Farms, Urbana
3 - Mellinger Farms, Leetonia

4 - Logan Farms, Mt. Gilead
5 - Chase Farms, Defiance

Soil analyses conducted at Research-Extension Analytical Lab, The Ohio Agricultural Research and Development Center, Wooster.

Table 1. Cultural and pest control practices used on Ohio statewide potato trials - 1989.

	Farm 1 (M)	Farm 2 (Th)	Farm 3 (Me1)	Farm 4 (L)	Farm 5 (C)
Date planted	May 31	May 22	May 27	June 1	May 30
Date killed	Frost	September 2	September 12	-	September 23-25
Date harvested	October 5	September 28	September 27	October 4	October 3
1988 crop	Sweet corn	Wheat	Corn	Corn	Potatoes
Cover crop	Rye	Timothy+60 lbs. N	Corn Stalks	Corn Stalks	Nothing
Fertilizer plowed down					
Applied in row	1000 lbs 10-26-26	900 lbs 9-25-25	1000 lbs 10-20-20	1bs 150-175-175 +30# S+15# MgO	112 gal. 5-15-15 60#-180#-180# 30 gal. 28%N
Side dressed	Urea				
Herbicide					
Incorporated		Lorox + Dual	Dual + Lorox		
Preemergence	Dual				
Systemic Insecticide	Temik	Thimet	Thimet	Thimet	Temik 18-20#
Spacing	8" x 36"	9" x 36"	8" x 36"	9" x 36"	10-1/2" x 36"
Soil type	Silt loam	Silt loam	Silt loam	Heavy silt loam	Sandy silt loam

Table 2. Rainfall and irrigation records for Ohio statewide potato trial plots - 1989.

	Farm 1 (M)	Farm 2 (Th)	Farm 3 (Me1)	Farm 4 (L)	Farm 5 (C)
Date planted	May 31	May 22	May 27	June 1	May 30
Date killed	Frost	September 22	September 12	-	September 23-25
Date harvested	October 5	September 28	September 27	October 4	October 3
	Rainfall - Irrig.	Rainfall - Irrig.	Rainfall - Irrig.	Rainfall	Rainfall
	- - - - -	- - - - -	- - - - -	- inches -	- - - - -
April	7.4	--	--	--	--
May	5.7	3.5	2.25	--	1.3
June	4.4	8.4	9.80	4.06+ ^z	7.1
July	3.6	3.0	2.00	3.37	3.95
August	5.9	2.3	1.55	1.71	1.05
September	2.9	--	3.10	.92	4.4
Season Total		19.7	18.7	10.06	17.8
June/July/August		16.2	13.35	9.14	12.1
Avg. Yields					
U.S. No. 1					
Main Trials					
Cwt/A	248	200	225	205	

^zRecords start June 12

Table 3. Stand counts for 1989 statewide main trials, observational, and russet trials.

Cultivar	Cooperating Farms					Cultivar Mean
	1(M)*	2(Th)	3(Mel)	4(L)	5(C)	
	<u>MAIN</u>		<u>TRIALS</u>			
Atlantic	92	87	89	91	90	
Kanona(N.Y. 71)	69	86	92	85	83	
LA01-38(LaBelle)	97	70	80	65	78	
Norchip	84	94	86	80	86	
Langlade	93	85	85	78	85	
MS700-83	69	84	89	84	81	
MS716-15	85	75	90	79	82	
Allegany(N.Y. 72)	87	83	87	78	84	
Katahdin	94	81	67	88	82	
Steuben(N.Y. 81)	81	76	78	82	79	
W855	89	79	97	85	87	
MS700-70	-	84	89	99	91	
B7592-1	87	76	90	88	85	
Farm Mean	86	82	86	83	84	
<u>OBSERVATION TRIALS</u>						
Superior	87	89				88
Gemchip	84	87				85
NY 78	77	88				82
W979	78	89				83
Kennebec	92	90				91
Chaleur	88	74				81
W848	79	90				84
Farm Mean	84	87				85
<u>RUSSET TRIALS</u>						
Rus. Norkotah				77		
W1059				83		
ND1113-10				85		
ND671-4 Rus.				92		
W848				89		
CO8011-5				77		
Farm Mean				84		

* Stand counts were not taken because of wet conditions

Table 4. Percent of B's and culls, major external defects for main trial cultivars. Results are the mean values for four farms, 1989

Cultivar	%B's	% Culls	Major Defects ¹
			External
LA01-38(LaBelle)	1.7	4.9	Sh. 2nd Cr.
Steuben(N.Y. 81)	1.8	4.5	Sc. Sh. Cr. 2nd
MS700-83	2.6	7.5	Cr. Gr. Sh. Sc.
Atlantic	2.5	2.8	Sh. Gr. 2nd. Sc.
B7592-1	3.3	4.4	Sh. Gr. 2nd. Sc.
W855	5.5	2.1	Sh. Sc.
MS700-70	2.9	5.2	Sh. 2nd. Gr. Sc.
Allegany(N.Y. 72)	2.9	4.5	2nd. Sh. Cr.
Langlade	4.3	5.8	Gr. 2nd. Cr. Sc.
Katahdin	3.1	5.5	Sh. 2nd. Gr. Sc.
Kanona(N.Y. 71)	2.3	3.3	Sc. 2nd. Sh. Gr.
MS716-15	2.5	5.5	Sh. Gr. Sc. 2nd
Norchip	4.4	9.8	2nd. Sh. Cr. Sc.
Average	3.0	5.1	

¹Abbreviations for external defects:

- Sh. = misshapen
- 2nd = second growth
- Cr. = growth cracks
- Gr. = greening
- Sc. = scab

Table 5. Total yield, percent U.S. No. 1 and marketable yield for main trial potato cultivars. Statewide trials - 1989.

Cultivar	Farm 1 (M)			Farm 3 (M)			Farm 4 (L)			Farm 5 (C)			Mean of 4 Farms		
	Yield Cwt/A	No. 1 %	yield Cwt/A	No. 1 %											
LAC1-38 (LaBelle)	315	90	283	212	86	182	245	93	228	206	78	156	243	87	214
Steuben (N.Y. 81)	291	87	253	206	89	183	261	89	232	222	85	125	247	87	215
Langlade	280	87	244	177	83	147	247	85	210	198	65	129	235	86	122
MS700-70	276	80	221	226	83	188	236	95	218	159	77	122	223	84	137
Allegany (N.Y. 72)	254	88	223	209	81	169	199	92	183	201	80	161	216	85	164
Kanona (N.Y. 71)	251	88	221	170	75	127	174	88	153	182	85	161	196	82	142
Atlantic	245	90	220	158	90	142	261	92	240	203	85	173	217	89	143
Norchip	241	84	202	170	75	127	221	76	168	202	52	136	223	72	161
B7592-1	238	80	190	240	88	211	228	87	198	203	83	163	227	34	191
Katahdin	219	85	186	240	85	204	179	83	158	217	74	161	214	83	173
MS700-83	211	76	160	213	83	177	308	86	263	250	74	185	245	26	196
MS716-15	209	78	163	208	89	185	196	90	176	139	79	110	188	54	152
W855	198	81	160	176	85	150	202	91	184	211	93	175	197	25	167
Mean	248	84	208	200	85	170	225	83	200	205	77	158	221	84	138

Table 6. Total yield, percent U.S. No. 1 and marketable yield for observational potato cultivars, statewide trials, 1989.

Cultivar	Yield Cwt/A	Farm 3 (Me)		No. 1 Cwt/A
		No. 1 %		
Chaleur	173	80		138
W979	142	81		115
NY 78	118	88		104
W848	118	81		96
Superior	116	77		89
Kennebec	101	76		77
Gemchip(BR 7093-24)				
Mean	128	80.5		103

Table 7. Total yield, percent U.S. No. 1 and marketable yield for russet trial cultivars, statewide trials - 1989.

Cultivar	Farm 1(M)			Farm 5(C)			Mean of 2 Farms		
	Yield Cwt/A	No. 1 %	No. 1 Cwt/A	Yield Cwt/A	No. 1 %	No. 1 Cwt/A	Yield Cwt/A	No. 1 %	No. 1 Cwt/A
Russet Norkotah	190	80	152	80	64	51	135	72	97
W1059	183	69	126	92	53	49	137	61	84
ND1113-10	153	66	101	41	32	13	97	49	48
ND671-4 Rus	142	66	94	71	58	41	106	62	66
W848	232	71	165	63	60	38	147	65	96
C08011-5	127	68	86	79	70	55	103	69	71
Mean	171	70	120	71	56	40	121	63	77

Table 8. Mean U.S. No. 1 yields in cwt per acre for major entries in the Ohio statewide potato trials of all farms each year grown in the last ten years and grown more than one year.

Cultivar	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989
<u>Early and Med. Early</u>										
Jenseq	207	294	161							131
Superior				141	230	266	321	225		
Conestoqua								272	105	
Rus. Norkotah										
<u>Early Midseason</u>										
Crystal	273	254								
Langlade	296	311	388							
Norchip	201	231	337	184	208	228	301	236	160	161
<u>Midseason</u>										
LA01-38(LaBelle)										
Katahdin	267	292	374	238	315	359	413	330	235	211
						335	363	276	187	178
<u>Late</u>										
Denali	316	269				300	206			
F1ba (NY59)			324	373		245		393		
Neb. A 129-69-1	320	336		341	207		278			
WNC521-12								325	344	
MS700-70									241	233
										187

Some of the cultivars grown in Ohio for which the characteristics are well known after several years of testing have been omitted in later years. Some cultivars listed were included in the trials prior to the last ten years. Among these are Shurchid, Monona, Kennebec, Atlantic, Crystal, Sebago, Red Pontiac, Red LaSoda, etc. Katahdin, Norchip and Superior are well known and used as standards for comparison.

Table 9. Specific gravity, chip color, percent blister, and Agtron E-5F readings of potato cultivars grown at four farms in statewide trials, 1949

Cultivar	Farm 1 (W)				Farm 3 (W)				Farm 4 (L)				Farm 5 (C)			
	Spec	Chip ^v	%	Spec	Chip	%	Spec	Chip	%	Spec	Chip	%	Spec	Chip	%	Spec
L401-38	1.073	2	10	34.8	1.073	3	20	39.5	1.083	3	20	34.8	1.060	3	10	41.5
Steuben	1.073	4	30	32.4	1.083	3	10	38.7	1.089	4	60	29.2	1.060	4	20	33.3
MS700-83	1.069	4	16	34.7	1.085	3	10	38.7	1.080	4	10	32.2	1.068	4	30	24.1
Atlantic	1.075	5	40	36.5	1.097	3	50	44.7	1.097	4	40	34.9	1.070	5	20	24.1
31592-1	1.063	4	20	32.2	1.094	2	30	40.7	1.078	4	30	29.1	1.066	4	40	31.7
W855	1.072	2	30	34.3	1.089	3	40	54.1	1.099	4	40	29.8	1.060	3	10	40.9
MS700-70	1.070	4	30	31.6	1.089	3	10	35.8	1.085	3	20	34.6	1.069	3	20	39.4
Allegany	1.067	3	10	38.0	1.088	2	30	43.1	1.075	3	10	35.6	1.062	4	40	32.2
Langlade	1.060	3	10	29.2	1.072	1	20	39.3	1.064	3	10	36.3	1.060	4	30	30.0
Katahdin	1.066	4	20	38.4	1.077	4	30	51.5	1.072	4	50	30.6	1.060	4	10	33.2
Manana	1.064	3	30	34.8	1.074	3	30	41.7	1.074	5	20	37.1	1.060	4	20	30.1
MS716-15	1.077	3	20	30.6	1.092	3	30	55.7	1.084	4	70	31.9	1.072	3	20	32.9
Morond	1.065	3	10	37.1	1.082	3	60	57.2	1.080	4	20	30.3	1.062	3	20	41.6

Farm Mean 1.062 3.2 20.8 33.8 1.084 2.9 26.3 38.3 1.081 3.6 30.8 32.9 1.064 3.7 22.3 33.5

VPC/SFA Standards

^vPercentage of chips that develop blisters 20 mm in diameter during the frying process.

Table 10: Mean specific gravity, chip color, percent blister and Agtron E-5F readings based on statewide potato cultivar trials from four farms - 1989

Cultivar	Specific Gravity	Chip Color ^y	% Blister ^z	Agtron
LA01-38(LaBellie)	1.072	2.7	15	37.6
Steuben	1.076	3.7	30	33.4
MS700-83	1.075	3.7	15	32.4
Atlantic	1.085	3.7	32.5	32.8
B7592-1	1.073	3.5	30	33.4
W855	1.077	3	30	34.9
MS700-70	1.078	3.2	20	35.4
Allegany	1.074	3	22.5	37.2
Langlade	1.066	2.7	17.5	33.7
Katahdin	1.069	4	27.5	33.4
Kanona	1.068	3.2	25	35.9
MS716-15	1.081	3.2	35	32.8
Norchip	1.072	3.2	27.5	36.6
Mean	1.074	3.3	25.2	34.6

^y PC/SFA standards

^z Percentage of chips that develop blisters >20 mm in diameter during the frying process

Advanced Observation Trials (Wooster) Table 1. Total yields, U.S. No. 1 yields, grade distribution, specific gravity, chip color, percent blister and Agtron readings for advanced observation entries, 1989.

Cultivar	Total	U.S. Yield cwt/A	U.S. No. 1 cwt/A	B. No. 1 cwt/A	Size %	Culls %	Scab			Specific Gravity Type ^z	Chip Color ^y	% Blisters ^x	Agtron E-5F
							Area	Specific Gravity Type ^z	Color ^y				
MN13543	61	16	26	18	56	0	T-1	1.074	2	30	48.4		
MN13653	67	35	52	7	41	1	1.082	2	20	41.6			
MN10874	162	110	68	15	17	0	1.084	3	40	22.5			
AC80545-1	130	79	61	8	31	0	1.078	3	40	52.8			
BR7093-24(Gemchip)	158	122	77	11	12	T-1	1.087	3	30	48.7			
MS702-80	155	118	76	10	14	0	1.086	2	10	47.7			
W1024	99	56	57	12	31	0	1.088	3	20	41.6			
W979	123	77	63	14	23	1-1	1.080	2	20	45.0			
AF875-16	117	88	75	8	17	0	1.096	2	20	48.2			
AF1060-2	122	63	52	20	28	T-1	1.085	3	40	41.1			
CS7635-4	99	61	62	12	26	T-1	1.084	3	20	47.1			
BO242-2	146	89	61	20	19	0	1.080	3	10	41.5			
AF74114-4	108	59	55	19	26	0	1.088	3	30	41.5			
B9792-61	73	49	67	28	5	0	1.083	3	50	42.1			
LA01-38(LaBelle)	88	55	63	10	27	0	1.080	2	30	48.0			

^x Percentage of chips that develop blisters > 20 mm in diameter during the frying process

^y PC/SFA standards

^z Area - T-less than 1%; 1-10-20%; 2-21-40%; 3-41-60%; 4-61-80%; 5-81-100%.

Type - 1. Small, superficial; 2. Larger, superficial; 3. Larger, rough pustules; 4. Larger pustules, shallow holes; 5. Very large pustules, deep holes

Observation Trials (Wooster) Table 1. Total yields, U.S. No. 1 yields, grade distribution, specific gravity, chip color, percent blister and Agtron readings for Observation entries, 1989

Cultivar	Total Yield cwt/A	U.S. No. 1 cwt/A	U.S. No. 1 cwt/A	B. Size -	Culls -	Scab Area Type ^z	Specific Gravity -	Chip Color ^y -	% Blisters ^x -	Agtron E-5F
BO909-17	7.5	*	*	*	*	0	0	0	0	43.8
BO437-11	4.4	*	*	*	*	0	1.093	2	0	
B0220-14	15.0	*	*	*	*	0	1.093	2	0	
BO424-31	12.6	4.4	3.5	2.6	3.9	0	1.078	1	20	39.3
BC0038-1	3.9	*	*	*	*	1-1	1.078	1	10	38.7
CO8195-4	10.6	5.5	5.2	1.5	3.3	0	1.083	3		
AC81198-11	9.7	*	*	*	*	0	0	0		
AC77101-1	7.3	*	*	*	*	0	1.088	2	30	43.1
CO81822-1	10.2	*	*	*	*	T-1	1.077	4	30	31.3
BC0224-3	9.7	*	*	*	*	0	0	0		
AC7869-17	6.3	*	*	*	*	0	1.089	3	40	34.1
Saginaw Gold	10.9	*	*	*	*	T-1				
BR7093-24	13.6	9.9	7.3	8	1.9	0				
A76147-2	16.9	*	*	*	*	0				
A7411-2(5001)	12.6	8.1	6.4	1.9	1.7	0				
CO8138-6(1608)	7.5	*	*	*	*	0				
CO7918-11(1003)	4.8	*	*	*	*	T-1	1.069	3	10	40.1
ND2207-8 RUSS	7.7	*	*	*	*	0				
ND2141-4 RUSS	12.1	3.5	2.9	2.2	4.9	0	1.083	4	20	31.9
A74114-4(Frontier Russ)	11.9	7.1	6.0	1.7	2.3	0				
AF564-2	8.7	*	*	*	*	T-1	1.077	4	10	36.9
Russet Norkotah	15.5	10.1	6.5	1.0	2.5	0				
High lat Russet	10.2	*	*	*	*	T-1				
FL657	12.8	9.2	7.2	8	2.0	T-1				
F72090(Chaleur)	10.6	7.4	7.0	1.2	1.8	0				
B7592-1	16.5	8.4	5.1	2.5	2.4	0	1.084	3	10	38.2

^x Percentage of chips that develop blisters > 20 mm in diameter during the frying process

^y PC/SFA standards

^z Area - T-less than 1%; 1-10-20%; 2-21-40%; 3-41-60%; 4-61-80%; 5-81-100%.

Type - 1. Small, superficial; 2. Larger, superficial; 3. Larger, rough pustules; 4. Larger pustules, shallow holes; 5. Very large pustules, deep holes

* Sample size inadequate for grading

Observation Trials (Wooster) Table 2. Tuber data, external defects and internal disorders for observation entries, 1989.

Cultivar	- - Tuber Data ^z - - - % External defects --						- Internal Disorders ^y -					
	Tuber Color	Skin Texture	Tuber Shape	Eye Depth	Overall Appear	Growth cracks	Growth	2nd Sun	Grn Free	HH	15	1
	5	3	6	6	1	0	85	5	15	1	0	9
B0309-17	5	3	4	6	4	15	0	70	0	0	0	10
B0437-11	5	3	5	6	4	10	20	10	65	0	0	10
B0220-14	6	5	5	6	4	0	40	5	60	0	0	10
B0424-31	7	7	5	5	3	0	15	10	75	0	0	10
BC0038-1	7	7	5	5	3	0	30	0	70	0	1	9
C08195-4	5	3	5	6	4	0	30	0	70	0	3	7
AC81198-11	5	3	5	6	4	0	30	0	70	0	1	9
AC77101-1	5	4	6	5	5	0	15	0	85	0	0	10
C08182-1	7	7	5	6	5	0	25	0	75	0	0	10
BC0224-3	5	5	6	5	2	0	50	10	45	0	2	8
AC7869-17	5	3	3	5	5	10	25	0	65	0	0	10
Saginaw Gold	6	6	3	6	4	5	40	0	60	0	0	10
BR7093-24	7	7	3	5	6	0	5	5	90	0	1	9
A76147-2	7	7	6	7	5	0	40	0	60	0	2	8
A7411-2(50001)	6	4	6	6	5	20	15	0	65	0	0	10
C08138-6(1608)	6	4	5	5	3	0	30	0	70	0	0	10
C07918-11(1003)	6	5	5	5	3	30	25	5	45	0	1	9
ND2207-8 RUSS	5	4	6	7	3	0	30	0	70	0	0	10
ND2141-4 RUSS	5	4	6	6	3	15	45	0	45	0	0	10
A74114-4(Frontier Rus.)	6	4	5	5	7	0	0	5	95	0	1	9
AF564-2	6	7	3	5	4	5	25	5	75	0	3	7
Russet Norkotah	5	3	6	5	6	0	15	0	85	0	0	10
HighLat Russet	7	6	6	5	5	5	30	5	65	0	0	10
FL657	7	7	3	6	5	5	20	0	75	0	1	9
F72090(Chaleur)	7	7	3	6	8	0	15	0	85	0	0	10
B7592-1	8	8	3	8	7	0	10	0	90	0	0	10

y Hollow heart and internal necrosis ratings indicate the number of affected tubers found per 10 tubers sampled
 z See Tuber Data Rating System on Advanced Observation Trials (Wooster) Table 2.)

Advanced Observation Trials (Wooster) Table 2. Tuber data, external defects and internal disorders for advanced observation entries, 1989.

Cultivar	Tuber Data ^z			External defects			Internal Disorders ^y		
	Tuber Color	Skin Texture	Eye Shape	Overall Depth	Growth Appear	Cracks	Sun Growth	Grn Free	HH Nec
MN13543	5	4	4	6	3	0	40	5	55
MN13653	7	6	5	7	2	10	25	5	60
MN10874	5	3	3	6	5	10	0	85	1
AC80545-1	6	5	3	6	3	0	25	0	65
BR7093-24(Gemchip)	7	8	3	7	6	0	0	15	85
MS702-80	7	5	3	5	6	5	10	0	85
W1024	7	7	4	8	6	5	5	5	85
W979	7	6	3	5	5	15	10	5	75
AF875-16	7	6	3	5	7	0	0	10	90
AF1060-2	7	7	3	6	3	10	15	20	60
CS7635-4	7	7	3	5	4	10	15	15	65
B0242-2	7	7	3	5	4	0	20	15	70
AF74114-4	5	3	6	6	7	0	15	0	85
B9792-61	6	5	2	6	6	10	15	5	75
LA01-38(LaBelle)	7	6	3	4	6	0	15	0	85
								0	2
								0	8

y Hollow heart and internal necrosis ratings indicate the number of affected tubers found per 10 tubers sampled

z Tuber Data Rating System

Tuber Color: 1) purple 2) red 3) pink 4) dark brown 5) brown 6) tan 7) buff 8) white 9) cream
Skin Texture: 1) part. russet 2) mod. russet 3) mod. ruset 4) light russet 5) netted 6) slight net.

Tuber Shape: 1) round 2) mostly round 3) round to oblong 4) mostly oblong 5) oblong 6) oblong to long

7) mostly long 8) long 9) cylindrical

Eye Depth: 1) very deep 2) -- 3) deep 4) -- 5) intermediate 6) -- 7) shallow 8) -- 9) very shallow
Appearance: 1) very poor 2) -- 3) poor 4) -- 5) fair 6) -- 7) good 8) -- 9) excellent

OHIO (continued)

Introduction: Thirty-four varieties and clones were tested in 1989 at the Ohio Agricultural Research and Development Center, Wooster as part of the NE107 Regional Project (Breeding and Evaluation of Potato Clones for the Northeast).

Methods: Plots were planted on May 19, 1989 with 30 hills, 1 foot apart, in rows 36 inches apart. A randomized complete block design with 3 replications was used. Soil type was a Wooster silt loam (fine-loamy, mixed, mesic Typic Fragiudalf) with a pH of 6.0 and organic matter of 3.0%. Fertilization consisted of 1200 lbs/A 10-20-20, one-half applied at plow-down, and the remainder banded at planting. Herbicides used were Dual/Lexone. Pesticides included Dithane M45, Bravo 500, Thiodan, Pydrin, and Penncap. Plots were mechanically harvested on September 14, 1989. Chip samples were held at ambient air temperature and chipped 48 days after harvest. Chip color was evaluated using the standards established by the Potato Chip/Snack Food Association (PC/SFA). Objective color measurements were made with the Agtron E-5F. Specific gravity was determined using the potato hydrometer method. Hollow heart and internal necrosis ratings (Ohio Table 2) indicate the number of affected tubers found per 30 tubers examined.

Results: The 1989 growing season was excessively wet during May and June. Colorado Potato Beetle injury was severe throughout the season despite attempts at chemical control. Top yielding entries were Monona, LA01-38, B0242-2, B9792-8B, B9792-157, and WNC672-2. Of this group, LA01-38, B0242-2, and B9792-157 had U.S. 1 grades ranging from 74-82% of total yield. Fourteen varieties/clones produced marketable yields that were greater than the standard variety Katahdin (Ohio Table 1). Percentage of total yield of these varieties which was classified as U.S. No. 1 ranged from 58-87%.

TUBER DATA RATING SYSTEM

for

POTATO VARIETY TRIALS - NE107

Tuber Color

1. Purple
2. Red
3. Pink
4. Dark Brown
5. Brown
6. Tan
7. Buff
8. White
9. Cream

Skin Texture

1. Part. russet
2. Heavy russet
3. Mod. russet
4. Light russet
5. Netted
6. Slight net.
7. Mod. smooth
8. Smooth
9. Very smooth

Tuber Shape

1. Round
2. Mostly Round
3. Rd. to obl.
4. Mostly obl.
5. Oblong
6. Obl. to long
7. Mostly long
8. Long
9. Cylindrical

Eye Depth

1. VD
2. --
3. D
4. --
5. Intermediate
6. --
7. S
8. --
9. VS

Appearance

1. Very poor
2. --
3. poor
4. --
5. Fair
6. --
7. Good
8. --
9. Excellent

Ohio NE107 Table 1.

Variety	Yield	CWT/A	CWT/A	% of Yield	Size Distribution by Class (% of total yield)			Culls	Spec. Gravity
					Total	Marketable	U.S. No. 1 (>1-7/8")		
Atlantic	169	127	119	75	10	15	15	1.098	
Chaleur(F72090)	121	83	78	69	7	24	24	1.075	
Coastal Russet	141	61	57	43	24	33	33	1.079	
Jemseg	140	52	49	37	9	54	54	1.078	
Kanona(N.Y.71)	138	109	102	79	8	13	13	1.066	
Katahdin (std)	149	107	100	72	10	18	18	1.076	
Kennebec	190	95	89	50	17	33	33	1.081	
Monona	196	110	103	56	13	31	31	1.080	
Norchip	169	86	80	51	28	21	21	1.090	
Norland	168	136	127	81	10	9	9	1.071	
Russet Burbank	191	37	35	19	42	39	39	1.077	
Somerset	185	157	147	85	11	4	4	1.079	
Superior	148	96	90	65	18	17	17	1.084	
A7411-2	124	68	64	55	30	15	15	1.091	
AF875-16	165	81	76	49	18	33	33	1.103	
AF1060-2	190	118	110	62	23	15	15	1.084	
B0045-6	158	90	84	57	17	26	26	1.091	
B0220-14	123	57	53	46	22	32	32	1.089	
B0242-2	207	153	143	74	16	10	10	1.073	
B0257-3	189	123	115	65	24	11	11	1.098	
B9792-2B	113	62	58	55	26	19	19	1.100	
B9792-8B	240	144	135	60	20	20	20	1.099	
B9792-157	206	169	158	82	8	10	10	1.086	
B9792-158	106	67	63	63	22	15	15	1.088	
CS7635-4	169	98	92	58	12	30	30	1.074	
CS7639-1	147	100	93	68	8	24	24	1.075	
F77087	130	78	73	60	16	24	24	1.079	
LA01-38	246	179	192	78	15	7	7	1.095	
NY72 (Allegany)	145	100	93	69	11	20	20	1.084	
NY78	133	96	90	72	14	14	14	1.073	
NY81 (Steuben)	185	124	116	67	10	23	23	1.087	
WF31-4	168	146	136	87	7	6	6	1.095	
WNC672-2	227	132	123	58	18	24	24	1.080	
73C26-1	140	67	63	49	32	19	19	1.080	
W.D. LSD (K=100, 5% level)	73	73	73	73					

Ohio NE 107 Table 2.

Tuber shape and appearance, tuber defects, hollow heart ratings, internal necrosis ratings and chip color for varieties grown at Wooster, Ohio - 1989

Variety	Maturity	Shape	Total	Tuber data ¹			- Tuber defects (%)			Hollow Internal		
				Appear-	Sun-	burn	Mis-	Growth	Heart	Necrosis	Chip ²	Rating
Atlantic	6	2	10	2	2	5	3	0	0	5	4	
Chaleur(F72090)	1	4	6	9	2	7	0	0	0	0	4	
Coastal Russet	4	5	5	37	2	25	10	0	1	1	4	
Jemseg	3	3	5	35	10	0	25	0	0	0	4	
Kanona(N.Y.71)	3	3	6	9	2	7	0	0	0	3	3	
Katahdin	9	3	5	14	2	12	0	1	17	4		
Kennebec	8	4	3	47	12	32	3	0	0	0	4	
Monona	6	3	5	20	0	20	0	0	9	4		
Norchip	5	4	3	51	13	35	3	0	4	3		
Norland	1	3	7	5	0	3	2	0	0	0	4	
Russet Burbank	8	7	1	95	0	95	0	0	0	0	4	
Somerset	7	4	7	20	20	0	0	0	0	0	3	
Superior	9	3	5	32	3	27	2	0	0	1	4	
A7411-2	7	6	6	17	0	17	0	0	0	0	4	
AF875-16	6	3	5	20	5	10	5	0	1	1	3	
AF1060-2	5	2	6	9	0	7	2	0	1	1	3	
B0045-6	6	4	5	28	0	25	3	0	0	0	3	
B0220-14	5	5	5	31	0	28	3	0	0	0	3	
B0242-2	4	2	5	20	2	15	3	0	1	2	3	
B0257-3	4	3	7	2	0	0	2	0	0	1	4	
B9792-2B	5	2	5	3	0	0	3	0	0	3	3	
B9792-8B	8	4	3	35	5	27	3	0	5	4		
B9792-157	5	2	3	31	0	28	3	2	0	3		
B9792-158	6	4	4	30	7	23	0	1	3	4		
CS7635-4	8	3	4	38	0	25	13	0	1	3		
CS7639-1	5	3	3	38	8	27	3	0	0	0		
F77087	5	3	5	8	5	3	0	0	0	0	4	
LA01-38	6	3	6	17	2	15	0	0	1	3		
NY72(Allegany)	8	2	5	10	0	8	2	0	2	3		
NY78	8	3	5	17	2	8	7	0	0	3		
NY81(Steuben)	8	3	6	25	7	8	10	0	0	8	3	
WF31-4	4	3	7	10	0	0	10	0	0	4		
WNC672-2	7	2	6	7	0	7	0	0	0	4		
73C26-1	5	3	6	15	0	10	5	0	0	10	3	

¹ See standard NE107 rating system ²PC/SFA Standards

Ohio NE107 Table 3.

Plant stand, percent blister, Agtron readings, and additional tuber

data for varieties grown at Wooster, Ohio - 1989

Variety	Plant Stand	% Blister ¹	Agtron E-5F	Agtron Skin Texture	Tuber Data Eye Depth	- - - - -	Skin Color
Atlantic	74	20	40.1	5	5	- - - - -	7
Chaleur(F72090)	73	20	30.2	8	6	- - - - -	7
Coastal Russet	83	40	29.8	5	5	- - - - -	7
Jemseg	76	30	33.3	6	7	- - - - -	5
Kanona(N.Y.71)	92	40	34.9	7	5	- - - - -	7
Katahdin	76	40	33.9	7	4	- - - - -	7
Kennebec	90	10	38.1	7	6	- - - - -	7
Monona	97	30	33.0	7	4	- - - - -	7
Norchip	92	10	29.8	7	5	- - - - -	7
Norland	77	30	34.6	7	6	- - - - -	2
Russet Burbank	90	40	27.5	3	4	- - - - -	4
Somerset	82	20	36.3	7	7	- - - - -	6
Superior	76	40	40.6	6	5	- - - - -	7
A7411-2	92	50	31.8	4	7	- - - - -	5
AF875-16	89	10	40.5	7	6	- - - - -	7
AF1060-2	77	20	37.4	7	5	- - - - -	7
B0045-6	81	10	37.8	4	7	- - - - -	4
B0220-14	81	20	36.9	4	6	- - - - -	5
B0242-2	78	30	32.6	7	5	- - - - -	7
B0257-3	89	20	28.2	7	7	- - - - -	7
B9792-2B	87	40	38.6	5	5	- - - - -	7
B9792-8B	87	50	33.6	7	6	- - - - -	7
B9792-157	86	10	32.4	5	3	- - - - -	6
B9792-158	57	20	38.1	6	5	- - - - -	6
CS7635-4	84	20	32.1	7	5	- - - - -	6
CS7639-1	83	30	35.2	6	5	- - - - -	6
F77087	74	30	31.0	7	7	- - - - -	7
LA01-38	89	20	38.3	6	6	- - - - -	7
NY72 (Allegany)	89	10	35.8	5	5	- - - - -	7
NY78	69	20	35.4	7	6	- - - - -	6
NY81 (Steuben)	61	30	37.3	6	6	- - - - -	7
WF31-4	84	30	31.9	3	6	- - - - -	6
WNC672-2	92	60	30.5	4	7	- - - - -	7
73C 26-1	90	30	35.0	7	5	- - - - -	6

¹ Percentage of chips that develop blisters greater than 20 mm in diameter during the frying process

OREGON

A. Mosley, D. Hane, S. James, C. Stanger, and K. Rykbost

Introduction

The Oregon Variety Development Program includes all field aspects from the production and testing of up to 90,000 seedlings in single-hill plantings to final naming and release. Trials are conducted by the Hermiston (D. Hane), Central Oregon (S. James), Ontario (C. Stanger), and Klamath (K. Rykbost) stations as well as by the Department of Crop Science (A. Mosley) at Corvallis. Several trials are located on commercial farms to better simulate typical grower inputs.

Data presented here were generated by trials containing at least four replicates and usually more than one location. Approximately half of the replicated trials are not included in this report. So-called "Tri-state" and "Western Regional" trials are further described elsewhere in this volume under the authorship of S. Love, J. Pavek, and others.

Statewide Trial

Forty-six numbered selections were compared to four named varieties at the Hermiston, Klamath Falls, Ontario, and Powell Butte branch experiment stations. All trials contained at least four replications and crops were produced according to commercial practices in the area. The Ontario and Hermiston production sites are extremely long season with high yield potential while the Powell Butte and Klamath Falls areas are short season and normally characterized by moderate yields. The Ontario and Hermiston areas cater primarily to the processing industry while Central Oregon and Klamath Basin growers produce for fresh market and seed outlets. Because of space restrictions, only averaged data are presented here (Table 1). Additional information is available from the authors. Twenty-eight of the 46 selections in this test will be dropped from further testing. The remaining 18 will either be tested further in the Statewide or advanced to the Tri-state trial, which includes numerous locations in Idaho, Oregon, and Washington. Some of the more interesting selections in this test include A74212-1E, A74212-1L, A082281-1, ND02904-7, and A0882283-1.

Western Regional Trial

Eighteen Western Regional entries were compared at the Hermiston, Klamath Falls and Ontario stations. Promising entries included A082283-1, A7961-1, A082611-7, A081216-1, TND329-1Rus, and C08011-5 (Tables 2, 3, and 4). A082283-1 appears to have excellent potential for both fresh market and processing. It also performed well in the Statewide Trial.

Russet Trials

Russet-skinned selections were compared to named varieties in two commercial trials at Hermiston (Tables 5 and 6) and in an on-station planting at the Klamath Falls station (Table 7). A74212-1E (early) performed extremely well in early harvest trials on two commercial farms at Hermiston (Table 5) and in an early-harvest planting on the Klamath station (Table 7).

A74212-1E is thought to be an early-maturing clonal selection from A74212-1L (late), which usually leads all entries in yield in late-harvested plantings. A082281-1 also performed very well in Hermiston plantings and ranked fourth in U.S. No. 1 yields in the four-location Statewide trial (Table 1). It appears to have excellent potential.

Chipping Trials

Twelve chipping varieties were compared at Hermiston (Table 8) and 16 at Corvallis (Table 9) in 1989. Several entries were common to both locations. Four selections produced higher yields than Norchip at Hermiston and most produced higher yields at Corvallis. Selections showing promise at both locations included MS716-15, AF875-16 and E57-13. Other entries performing well at Corvallis included E55-35, ND01496, A80559-2, Allegany, and Gemchip. Gemchip showed a marked tendency toward hollow heart at Corvallis, probably partially due to large tuber size. Gemchip requires a slightly longer growing season than Norchip for good gravities and fry color. Allegany produced slightly darker chips than Norchip and Atlantic at Corvallis but not at Hermiston.

Oregon Table 1. Average performance of 50 selections and varieties at four locations.
Oregon Statewide Trial - 1989.

Entry	Yield, cwt/A		US No. 1		Oz/ Tuber	Spec. Grav.	Fry Color	Percent			Use ^{3/}	Plans ^{4/}
	Total	No. 1	Rank	%				HH	BS	BC		
R. Burbank	471	296	42	62	7.1	1.080	31	5	1	14	F, P	R
Lemhi	403	321	31	79	9.6	1.084	34	13	22	0	P	R
Norgold R.	349	277	45	79	7.1	1.070	35	16	1	6	F	R
R. Norkotah	394	318	33	80	8.9	1.069	32	5	0	1	F	R
A74212-1E	629	517	1	82	10.2	1.078	27	4	4	0	F	R
A74212-1L	589	465	2	78	12.1	1.077	21	8	1	1	F	R
C008014-1	434	358	18	82	8.3	1.079	42	7	2	0	P	R
A081216-1	313	243	50	77	5.9	1.082	34	5	4	0	P	D
A082283-1	507	397	5	78	9.2	1.085	49	6	11	0	P	R
A082611-7	434	323	30	74	7.6	1.081	40	1	3	0	P	R
A082616-18	397	288	44	71	7.4	1.089	43	0	8	0	P	D
A081362-3	449	369	14	82	6.5	1.082	31	0	5	0	P	R
C0083008-1	423	336	23	79	9.0	1.084	37	4	0	1	P	D
C0083021-1	474	374	12	78	9.6	1.085	39	7	0	0	P	R
A083037-10	529	449	3	84	9.2	1.075	33	9	2	0	P	D
A083110-3	358	275	46	76	6.9	1.079	39	44	0	0	P	D
A083119-3	380	267	49	70	7.1	1.080	29	4	4	0	P	D
A083177-6	446	362	15	81	8.1	1.078	35	3	3	4	P	R
A081178-12	432	360	17	83	9.3	1.085	31	9	3	2	F	D
A082281-1	448	400	4	89	8.9	1.081	37	10	4	2	P	R
C0083021-5	348	269	48	77	9.3	1.090	31	18	3	0	P	D
C0083085-5	441	376	9	85	8.8	1.074	31	4	0	0	P	D
C0082177-3	372	306	38	82	8.9	1.071	34	33	1	3	F	D
A08396-15	426	356	21	83	8.3	1.073	27	15	1	0	F	R
A082260-4D	353	303	41	85	8.5	1.074	47	1	0	0	P	R
A082260-4L	452	357	19	79	8.3	1.079	30	0	1	0	F	D
ND02845-1	415	312	36	75	7.5	1.084	40	1	1	0	C	R
ND02848-8	463	323	29	69	5.2	1.074	43	4	9	7	C	D
ND02871-1	408	303	40	74	10.4	1.072	26	10	0	0	F	D
ND02904-1	440	329	27	74	9.2	1.062	21	0	1	3	F	D
ND02904-7	451	387	8	85	10.7	1.069	28	2	2	0	F	R
ND02971-1	491	393	6	80	9.2	1.071	36	5	13	0	P	D
ND03056-3	444	318	35	71	9.5	1.077	34	0	0	0	P	D
ND03057-2	437	341	22	77	7.6	1.065	32	0	0	0	F	R
C0084206-2	482	375	10	77	8.0	1.070	24	0	1	0	F	R
A084040-1	422	306	37	72	6.7	1.066	22	1	2	0	F	D
A084059-2	443	356	20	80	8.0	1.094	33	2	6	0	P	R
A084107-1	400	304	39	76	11.7	1.071	30	17	1	0	P	D

1/ Photovolt reflectance readings; high numbers indicate light color

2/ HH = hollow heart; BS = blackspot bruise; BC = brown center

3/ C = chips; F = fresh market; P = processing

4/ D = discard; R = retain for further testing

Oregon Table 1. continued.

Entry	Yield, cwt/A		US No. 1		Oz/ Tuber	Spec. Grav.	Fry Color	Percent ^{2/}			Use ^{3/}	Plans ^{4/}
	Total	No. 1	Rank	%				HH	BS	BC		
A084134-1	437	373	13	85	10.6	1.087	42	10	12	2	P	R
A084172-3	405	318	34	78	8.2	1.081	43	5	4	0	P	D
A084172-6	388	291	43	75	6.7	1.083	43	1	2	0	P	D
A084175-6	410	328	28	80	9.4	1.088	42	27	0	0	P	D
A084180-1	421	334	24	79	8.2	1.078	33	5	0	0	P	D
A084180-2	475	388	7	81	9.8	1.083	31	18	1	3	P	D
A084183-1	484	361	16	74	8.0	1.074	24	15	2	0	F	D
A084217-1	366	270	47	73	9.0	1.078	39	2	4	0	P	D
C0084026-201	482	375	11	77	7.5	1.075	38	0	0	0	F	D
C0084055-205	442	332	26	75	8.7	1.090	44	11	2	3	P	R
A084427-203	418	320	32	76	7.0	1.104	42	4	3	2	P	D
A084427-203	418	334	25	79	8.6	1.091	41	18	2	0	P	D

1/ Photovolt reflectance readings; high numbers indicate light color

2/ HH = hollow heart; BS = blackspot bruise; BC = brown center

3/ C = chips; F = fresh market; P = processing

4/ D = discard; R = retain for further testing

Oregon Table 2. Performance of 18 potato varieties and selections at Hermiston, Oregon. Western Regional Trial - 1989.

Entry	Yield, cwt/A		% No. 1	% No. 1 > 12 oz	Oz/ Tuber	Spec Grav.	Fry Color	Severity 1/		Severity 2/		Percent 3/		
	Total	No. 1						Scab	GC	SB	HH	BC	BS	TI
A7816-14	430	327	76	47	9.4	1.076	1.1	5.0	4.5	5.0	8	1	11	24
A7961-1	568	388	68	53	9.0	1.075	1.2	5.0	4.5	5.0	4	0	0	7
AC77101-1	524	430	82	43	9.7	1.068	1.7	5.0	4.0	5.0	24	1	8	34
AC7869-17	494	348	70	57	10.8	1.071	0.9	5.0	4.0	4.8	8	0	1	10
AC81198-11	680	533	78	65	11.1	1.079	2.5	5.0	4.0	5.0	20	11	6	44
A081216-1	336	257	77	7	6.2	1.079	1.0	5.0	5.0	5.0	9	0	5	14
A0822831-1	661	535	81	61	10.9	1.083	0.0	5.0	4.5	5.0	20	0	13	33
A082611-7	605	462	76	51	9.5	1.074	0.5	5.0	4.5	4.8	0	1	1	6
BC0038-1	443	361	82	46	8.6	1.064	0.8	2.8	5.0	4.0	0	0	7	9
C07918-11	537	365	68	52	10.3	1.068	1.2	5.0	2.8	4.2	16	0	6	22
CO8011-5	500	425	85	49	10.0	1.062	2.3	5.0	4.0	3.8	5	0	1	6
NDTXB-31-1R	397	303	76	37	6.6	1.049	2.4	3.8	4.5	4.8	16	9	0	25
NDTX9-1068-11R	471	298	63	45	7.3	1.054	3.3	2.5	2.8	4.2	5	1	0	7
TND329-1RUS	506	415	82	38	9.6	1.057	1.9	5.0	3.2	3.2	0	0	5	7
Lemhi	529	382	72	52	10.0	1.080	1.0	5.0	4.2	5.0	6	0	28	33
R. Burbank	591	428	72	36	8.4	1.076	1.5	5.0	4.8	4.8	9	5	7	27
Norgold	354	273	77	15	5.7	1.061	0.0	5.0	5.0	5.0	23	0	0	23
Red Lasoda	666	373	56	59	10.5	1.057	2.3	1.5	3.2	5.0	8	9	1	22

1/ 0-4 rating scale; 4 = dark

2/ 1-5 rating; 1 = severe. GC = growth crack; SB = shatter bruise.

3/ HH = hollow heart; BC = brown center; BS = black spot bruise; TI = total internal defects.

Oregon Table 3. Performance of 18 numbered selections and nine named varieties at Klamath Falls, Oregon. 1989. Western Regional Trial.

Selection	Yield (cwt/A)		Percent			Specific Gravity
	Total	No 1's	No 1's	>10 oz	HH ¹	
Russet Burbank	559	355	64	12	15	1.083
Lemhi	426	295	69	29	35	1.085
Norgold	299	233	78	17	15	1.073
Red Lasoda	550	392	71	38	10	1.070
Shepody	330	219	66	27	0	1.082
Cal Gold	262	150	57	19	10	1.062
Cal One	339	304	90	31	60	1.084
Minnesota Russet	296	218	74	17	10	1.064
Frontier Russet	314	262	83	25	10	1.083
A7816-14	377	281	75	31	15	1.081
A7961-1	501	360	72	38	0	1.082
AC77101-1	474	354	75	33	50	1.075
AC7869-17	409	326	80	38	5	1.080
AC81198-11	458	323	71	32	10	1.083
A081216-1	212	139	66	7	25	1.081
A082283-1	472	238	50	13	0	1.084
A082611-7	452	338	75	16	5	1.084
BC0038-1	317	219	69	12	0	1.081
C07918-11	394	296	75	31	40	1.077
C08011-5	397	292	74	24	0	1.067
NDTX8-731-1R	242	170	70	17	0	1.062
NDTX9-1068-11	426	352	83	42	5	1.070
TN329-1RUS	378	321	85	40	0	1.071
AD7267-3	299	214	72	17	0	1.078
AD7818-5	356	240	67	21	0	1.087
NDD837-2	433	327	76	42	0	1.083
A7411-2	548	355	65	31	0	1.082
Average	389	280	72	27	12	1.078
CV (%)	18	20	--	--	--	---
LSD (.05)	99	80	--	--	--	---

1/ HH = hollow heart. Percentage based on 10 largest tubers/sample.

Oregon Table 4. Performance of 19 varieties and selections at Ontario, Oregon.
Western Regional Trial - 1989.

Entry	Yield, cwt/A		Percent		Spec. Grav.	Fry Color	1/ % SE
	Total	No. 1	No. 1	> 12 oz			
A7816-14	442	388	88	18	1.097	51	1
A7961-1	614	408	66	37	1.100	42	18
AC77101-1	441	344	78	19	1.092	40	8
AC7869-17	408	296	73	38	1.086	62	0
AC81198-11	460	340	74	32	1.093	24	95
A081216-1	423	331	78	10	1.096	33	42
A082283-1	510	430	84	27	1.098	54	0
A082611-7	473	372	79	17	1.096	47	6
BC0038-1	400	316	70	31	1.087	49	2
C07918-11	396	340	86	35	1.080	56	0
C08011-5	437	335	77	35	1.075	35	20
NDTX8-731-1R	450	404	90	24	1.069	33	55
NDTX9-1068-11R	548	514	94	41	1.072	23	90
TND329-1RUS	428	375	88	31	1.066	33	40
Lemhi	445	388	87	25	1.094	51	6
R. Burbank	492	335	68	10	1.080	29	50
Norgold R.	336	293	87	14	1.075	34	30
Red LaSoda	507	439	87	39	1.078	33	50
Shepody	344	185	54	12	1.089	44	23

1/ Photovolt reflectance; high readings = light color

2/ SE = sugar end or dark stem end fry color

Oregon Table 5. Average performance of six early-harvested varieties on two commercial farms near Hermiston, Oregon - 1989.

Entry	Yield, cwt/A		Percent		Oz/Tuber	Spec. Grav.	USDA Color	1/ Color
	Total	No. 1	No. 1	Usable				
HiLite	408	331	79	81	5.0	1.023	0.1	
Norkotah Rus.	424	304	69	70	4.5	1.068	0.2	
A74212-1E	700	607	86	89	6.4	1.081	0.2	
A74212-1 L	665	543	81	89	7.1	1.078	0.5	
Frontier	392	308	78	80	5.3	1.077	0.2	
A082281-1	600	534	88	90	7.3	1.083	0.0	

1/ 0-4 visual rating scale; 0 = light

Oregon Table 6. Average performance of nine late-harvested varieties on two commercial farms near Hermiston, Oregon - 1989.

Entry	Yield, cwt/A		Percent			Oz. Tuber	Spec. Grav.
	Total	No. 1	No. 1	Usable	> 12 oz		
R. Burbank	835	582	69	83	41	8.3	1.085
A7411-2	699	567	81	89	64	9.7	1.089
A74212-1E	786	691	88	92	47	9.3	1.076
A74212-1L	909	781	86	93	80	14.1	1.081
A7896-7	764	522	69	83	48	9.1	1.080
A082281-1	792	716	90	93	67	11.7	1.077
A082611-7	800	582	73	83	32	7.7	1.088
A082616-18	604	505	82	86	32	7.1	1.087
C008014-1	648	565	87	90	32	7.8	1.078

Oregon Table 7. Performance of seven selections and named varieties at Klamath Falls, Oregon. 1989 Early Russet Trial.

Entry	Yield, cwt/A		Percent			HH ^{1/}	Spec. Grav.
	Total	No. 1	No. 1	> 10 oz			
Norgold	542	441	81	27	13	1.073	
Krantz	507	431	85	22	0	1.075	
Norkotah	527	418	79	37	10	1.068	
HiLite	422	337	80	15	0	1.071	
A74212-1E	531	435	82	31	3	1.072	
A74212-1L	507	419	83	21	5	1.074	
Frontier Russet	408	331	81	19	0	1.079	
Average	492	402	82	26	4	1.073	
CV (.05)	17	19	--	--	--	---	---
LSD (.05)	128	NS	--	--	--	---	---

1/ HH = hollow heart. Percentage based on 10 largest tubers/sample

Oregon Table 8. Performance of 12 chipping varieties at Hermiston, Oregon - 1989.

Entry	Yield, cwt/A			Percent			0z/ Tuber		Spec. Grav.	Chip 1/ Col			Severity 2/ Scab GC SB			Percent of Tubers with 3/ HH BC IBS BS VD Total			
	Total	No. 1	No. 1	No. 1	Usable	>12 oz	Oz/ Tuber	Spec. Grav.		Scab	GC	SB	HH	BC	IBS	BS	VD	Total	
Allegany	743	657	88	88	49	9.2	1.078	3.0	3.5	4.8	4.0	13	1	0	7	0	21		
Norchip	635	482	76	76	30	7.8	1.070	3.2	2.8	4.0	5.0	14	8	1	1	4	28		
MS716-15	705	608	86	86	29	8.2	1.086	2.1	4.4	5.0	4.2	2	1	0	2	1	6		
BN9805-2	426	339	79	79	40	8.3	1.062	5.0	2.8	2.0	1	1	0	0	2	0	5		
E55-27	649	514	79	79	10	6.0	1.074	2.9	4.0	4.5	3.8	27	13	0	3	0	43		
E55-35	572	426	74	74	7	6.1	1.082	1.8	3.5	5.0	5.0	3	3	0	0	0	3		
E57-13	699	591	84	84	23	7.3	1.085	2.0	4.0	4.0	4.5	7	0	0	1	0	8		
MS700-70	567	455	80	80	26	6.7	1.084	3.2	3.5	4.8	4.8	5	2	1	2	3	13		
NEA219.70-3	446	379	85	85	42	7.9	1.064	2.2	4.2	3.9	4.8	22	0	0	2	0	24		
NY85	460	344	75	75	4	5.6	1.077	2.8	4.0	5.0	4.2	0	4	0	2	0	5		
CS7232-4	466	381	82	82	31	7.7	1.063	1.7	3.2	4.8	5.0	1	0	0	1	3	5		
AF875-16	509	425	83	83	24	7.0	1.088	2.0	3.5	4.8	5.0	0	2	0	5	1	8		

Entries supplied and trial supported by Anheuser-Busch Companies

1/ 1-5 rating scale; 5 = dark

2/ 1-5 scale; 1 = severe

3/ GC = growth cracks; SB = shatter bruise; HH = hollow heart; BC = brown center; IBS = internal brown spot;
BS = blackspot bruise; VD = vascular discoloration

Oregon Table 9. Performance of 16 varieties and advanced selections at Corvallis, Oregon - 1989.

Entry	Yield, cwt/A			Oz/ Tuber			% Culls			Spec. Grav.		Fry Color 1/		Percent 2/		
	No. 1	Total	No. 1	%	No.	1	<4 oz	%	Culls			11/9	12/15	BC	HH	IN
Gemchip	392	467	84	7.6	3.6	12.0	1.074	1.75	2.62	1.0	28.0	0.0	0.0	1.0		
Norchip	220	420	52	4.9	12.3	35.2	1.082	1.50	2.50	3.0	0.0	1.0	1.0	12.0		
Atlantic	366	458	77	6.0	7.4	12.8	1.095	1.50	2.50	1.0	4.0	3.0	3.0	12.0		
ND0 1496	280	419	67	5.6	9.5	23.7	1.086	1.25	2.37	0.0	0.0	0.0	0.0	3.0		
A80559-2	301	480	64	7.4	9.1	27.0	1.101	2.12	2.87	0.0	6.0	0.0	0.0	8.0		
E57-13	351	410	85	5.0	10.0	4.6	1.077	1.75	2.00	1.0	5.0	0.0	0.0	14.0		
E55-27	288	361	79	5.1	10.9	9.6	1.086	1.50	2.50	2.0	7.0	3.0	3.0	8.0		
E55-35	317	377	84	4.9	10.3	5.7	1.097	1.75	2.37	0.0	1.0	0.0	0.0	0.0		
Alliegany (NY72)	385	485	78	7.7	4.5	17.3	1.084	2.37	2.87	1.0	6.0	0.0	0.0	7.0		
NY85 (D195-24)	213	271	78	4.1	15.0	6.4	1.085	1.87	2.25	0.0	0.0	0.0	0.0	7.0		
NEA219.70-3	262	386	67	6.2	7.2	25.4	1.074	2.50	2.62	0.0	16.0	0.0	0.0	12.0		
BN9805-2	117	222	53	4.9	18.2	28.5	1.069	2.75	3.63	0.0	7.7	11.0	1.2			
MS700-70	287	396	72	5.4	9.2	18.7	1.094	2.00	2.62	1.0	6.0	1.0	1.0	10.0		
MS716-15	379	448	84	5.7	8.6	6.9	1.093	2.37	2.62	0.0	1.0	0.0	0.0	3.0		
AF875-16	299	376	80	5.8	6.3	13.8	1.087	1.12	2.00	2.0	2.0	2.0	2.0	16.0		
CS7232-4	182	211	85	5.7	9.8	5.2	1.069	1.37	2.12	3.0	0.0	1.0	1.0	22.0		
Average	290	387	75	5.7	9.5	15.8	1.085	1.84	2.53	0.9	5.6	1.4	1.4	8.5		
LSD, .05	78	83	10	1.1	4.4	9.8	0.011	0.7	0.4	2.7	6.3	5.3	NS			

1/ PC/SFA color chart ratings; low numbers = light color

2/ BC = brown center; HH = hollow heart; IN = internal necrosis; VD = vascular discoloration; NS = differences not significant.

Variety
Development
and Testing

Texas

J. Creighton Miller, Jr. and Douglas G. Smallwood

Seedling Program. Some 38,000 first-year seedlings representing 183 families were grown for selection near Springlake in 1989 and 354 original selections were made from this material. The 1989 first-year seedlings from Texas resulted from crosses made in the greenhouse at the Texas Agricultural Experiment station near Lubbock during the winter of 1987-88. The remainder were obtained from Joe Pavek in Idaho (12,253), Bob Johansen in North Dakota (2,519) and David Holm in Colorado (9,668). The Texas program supplied the North Dakota, Idaho, and Colorado programs with second, third and fourth size seedling tubers for selection.

Strain Selection. We undertook a new initiative which resulted in the selection of 375 subclonal variants of Russet Norkotah from two diverse locations. The objective of this initiative is to develop superior Russet Norkotah strains which possess stronger vines to resist environmental stresses such as hail and hot, desiccating winds.

Adaptation Trials. The 1989 growing season was marked by near normal seasonal temperatures and rainfall. Due to economic limitations, trials were grown only at Springlake this year. In general, vine growth and yield were slightly above average. The variety and advanced selection trials at Springlake were planted on April 8 and harvested on August 21. Forty russet varieties or advanced selections, including the variety Russet Norkotah and 12 Russet Norkotah strains were tested for their adaptability to Texas conditions (Table 1). The Russet Norkotah strains were selected by Gene Shaver in Nebraska. A number of the strains performed quite well in comparison to regular Russet Norkotah. The outstanding entries based on total yield and general rating were Russet Norkotah #9, A 74212-1, Russet Norkotah #6 and ATX 6-84510-2 Ru. Based on general rating, the entries NDTX 9-1069-4 Ru, Norgold "M" (Neb), ATX 6-84026-1 Ru, ND 1538-1 Ru and NDTX 6-1215-2 Ru deserve mention. The selection A 74212-1 performed quite well again this year: however, it did produce a large number of misshapen tubers resulting in grade reduction. The same problem existed with a number of the Russet Norkotah strains. The outstanding white entries based on total yield and general rating were TX 5-1143-2 W, NDA 2031-2 and NDA 2126-6 (Table 2).

Other white entries deserving mention include TX 5-1148-3 W, LA 01-38 and AC 80545-1. The outstanding red entries based on total yield and general rating were NDTX 9-1068-11 R, Viking, Redsen "C" and LA 12-59. The overall performance of Red LaSoda was disappointing, perhaps due to its poor stand of 40%. A number of Norgold Russet strains, as well as Norgold Russet were tested at Springlake (Table 3). In general, the strains continue to outperform Norgold Russet. The outstanding entries based on total yield and general rating were Norgold "M", Norgold #19 and Norgold #40. All of the strains produced a significantly higher percentage of U.S. No. 1 grade potatoes by weight than did regular Norgold Russet. Regular Norgold Russet produced tubers that were lower in average weight when compared to the Norgold Russet strains.

The advanced selection trial (Table 4) consisted of 21 advanced selections which were made at Springlake in 1986 from crosses made in Idaho and Texas. The outstanding entries based on total yield and general rating were TX 6-1229-2 Ru and ATX 6-84378-1 Ru. The selection TX 1229-2 Ru produced a significantly higher yield of over-10-ounce tubers than any other entry. A number of other entries performed quite well in comparison to the check varieties. Those deserving mention include: ATX 6-84388-2 Ru, ATX 6-84377-2 Ru and ATX 6-84026-1 Ru. The strip trial at Springlake consisted of 9 varieties or strains and three promising advanced selections for which sufficient seed were available for strip planting of 300 foot rows (Table 5). Strip trials more closely approximate grower conditions and represent a more advanced phase of testing than replicated variety trials. In early September, six randomly selected plots of each entry were harvested. The outstanding entries based on total yield were Norgold #40, NDTX 9-1068-11 R, Russet Norkotah, A 74212-1 and Norgold "M". The outstanding entry based on overall appearance and total yield was NDTX 9-1068-11 R. This selection produced a high percentage of No. 1 grade tubers with brilliant red color. Norgold #40 produced a significant number of rough, misshapen tubers resulting in a large percentage of No. 2 grade tubers. Russet Norkotah performed quite well again this year. This variety produces a high percentage of uniform and attractive oblong tubers. Total yield of A 74212-1 was somewhat lower as compared to previous years. This was due to a low production of over-10-ounce tubers. The standard variety, Norgold "M", performed quite well, producing a nice crop of attractive oblong tubers. Other entries deserving mention include Krantz, Viking and Red LaSoda. The performance of HiLite continues to be poor, indicating that it is not adapted to this area.

Summarizing results of all trials at Springlake, the most promising varieties and advanced selections were Russet Norkotah, NDTX 9-1068-11 R, TX 5-1143-2 W, A 74212-1, TX 6-1229-2 Ru, ATX 6-84378-1 Ru and TX 7-1333-2 W. Additional information is needed on these selections regarding cultural practices specific to Texas growing conditions. Norgold "M" continues to be the most consistent performer of the Norgold Russet strains and is still the standard russet variety for the Texas potato industry.

Texas Table 1. Total yield, yield of U.S. No. 1 potatoes, average tuber weight, specific gravity, tuber type, skin type and general rating of 40 russet potato varieties or selections grown at Springlake, Texas - 1989.

Variety or Selection	U.S. No.1 CWT/A			Average Tuber Weight in oz.			Skin Type	General Rating 1/
	TOTAL YIELD CWT/A	Total Yield 10 oz.	Over 10 oz.	Specific Gravity	Tuber Type			
Russet Norkotah #9	476.3	383.3	83.2	6.1	1.065	Long	Russet	3.0
A 74212-1	445.3	360.7	113.3	7.2	1.070	Long	Russet	3.0
Russet Norkotah #6	408.5	338.8	108.4	7.2	1.062	Long	Russet	4.0
ATX 6-84510-2 Ru	397.8	281.7	74.9	6.8	1.066	Oblong	Russet	3.3
Russet Norkotah #24	385.3	311.7	32.9	5.9	1.060	Long	Russet	3.0
TX 5-987-2 Ru	368.8	232.3	71.3	5.8	1.071	Oblong	Russet	2.7
BC 0224-3	343.6	213.6	22.6	5.6	1.079	Oblong	Russet	3.0
CO 8195-4	327.8	249.1	51.9	6.8	1.057	Oblong	Russet	3.0
Russet Norkotah #3	327.2	207.2	56.1	4.8	1.063	Long	Russet	3.0
Russet Norkotah #7	309.8	230.4	19.4	4.7	1.062	Long	Russet	2.0
NDTX 9-1069-4 Ru	308.8	253.9	76.8	6.6	1.070	Oblong	Russet	3.7
Norgold "M" (Co)	289.1	219.7	72.3	7.2	1.062	Oblong	Russet	3.0
Russet Norkotah #8	288.5	193.6	58.1	4.7	1.057	Long	Russet	2.0
Norgold "M" (Neb)	288.1	236.8	97.1	8.0	1.064	Oblong	Russet	3.7
ATX 6-84026-1 Ru	285.9	213.9	47.4	6.8	1.060	Oblong	Russet	3.3
Russet Norkotah #13	274.9	193.6	36.8	5.4	1.064	Long	Russet	3.0
Russet Norkotah #11	265.2	205.2	32.9	8.1	1.068	Long	Russet	3.0
ATX 6-84451-2 Ru	263.9	209.7	32.6	5.4	1.063	Oblong	Russet	2.7
Krantz	261.7	218.8	82.9	7.7	1.065	Oblong	Russet	3.0
ATX 6-84703-2 Ru	259.7	189.4	16.8	5.5	1.064	Oblong	Russet	2.7
ATX 6-84529-1 Ru	258.1	211.7	55.5	6.8	1.064	Oblong	Russet	3.0
Russet Norkotah	257.2	217.2	50.3	6.7	1.063	Long	Russet	3.0
Russet Nugget	253.6	163.9	7.1	5.3	1.081	Oblong	Russet	2.3
ATX 6-843888-2 Ru	253.0	197.1	60.0	6.1	1.064	Oblong	Russet	2.7
Hilite	232.3	150.0	0.0	4.9	1.063	Oblong	Russet	2.0

Texas Table 1. Continued.

Variety or Selection	U.S. YIELD CWT/A		CWT/A		Average Tuber Weight in oz.	Specific Gravity	Tuber Type	Skin Type	General Rating 1/ 1/
	TOTAL YIELD CWT/A	Total Yield 10 oz.	Over 10 oz.	No. 1					
CO 8136-6	227.2	159.7	39.0	6.1	1.069	Oblong	Russet	2.0	
Cal-Ore	223.9	137.8	10.6	6.9	1.070	Oblong	Russet	3.0	
Russet Norkotah #10	218.8	133.6	0.0	4.5	1.059	Oblong	Russet	3.0	
ND 1538-1 Ru	218.1	172.6	41.9	6.6	1.056	Oblong	Russet	3.3	
Russet Norkotah #1	208.1	182.0	34.8	6.4	1.062	Long	Russet	3.0	
TX 5-1169-1 Ru	203.9	178.8	76.5	7.6	1.068	Oblong	Russet	2.7	
Russet Norkotah #12	199.4	158.8	62.0	6.1	1.060	Long	Russet	3.0	
Targhee	196.8	127.1	12.9	5.1	1.068	Oblong	Russet	2.0	
TX 0-754-1 Ru	191.3	143.3	51.9	5.8	1.062	Oblong	Russet	2.3	
CO 8182-1	190.1	123.9	2.9	5.0	1.064	Oblong	Russet	1.7	
ND 671-4 Ru	167.1	89.1	0.0	5.3	1.057	Oblong	Russet	2.3	
NDTX 6-1215-2 Ru	164.9	138.4	21.6	7.8	1.064	Oblong	Russet	3.3	
NDTX 6-2810-1 Ru	164.9	118.7	41.6	5.8	1.066	Oblong	Russet	2.7	
Russet Norkotah #14	147.1	110.4	23.2	6.4	1.059	Long	Russet	2.0	
NDTX 6-3018-1 Ru	113.6	83.2	14.8	6.4	1.059	Oblong	Russet	2.7	
Russet Norkotah #5	110.4	36.8	0.0	2.9	1.000	Oblong	Russet	1.0	
Average	262.8	194.5	43.7	6.1	1.063		2.3		
L.S.D. (.05)	92.4	72.0	36.5	1.6					

1/ 1 = very poor to 5 = excellent

Texas Table 2. Total yield, yield of U.S. No. 1 potatoes, average tuber weight, specific gravity, tuber type, skin type and general rating of 20 red and white potato varieties or selections grown at Springlake, Texas - 1989.

Variety or Selection	U.S. No. 1 CWT/A			Average Tuber Weight in oz.			Specific Gravity	Tuber Type	Skin Type	General Rating 1 /
	TOTAL YIELD CWT/A	Total Yield	Over 10 oz.							
TX 5-1143-2 W	402.7	355.6	156.2	10.0	1.063	Oblong	White	White	3.0	3.0
NDA 2031-2	364.3	127.5	0.0	3.3	1.073	Oblong	White	White	3.0	3.0
NDA 2126-6	363.0	269.7	97.8	5.5	1.074	Oblong	White	White	3.5	3.5
TX 5-1148-3 W	315.2	270.1	103.6	6.7	1.070	Oblong	White	White	3.0	3.0
LA 01-38	289.8	252.3	132.0	7.1	1.072	Oblong	White	White	3.3	3.3
AC 80545-1	261.7	219.7	81.3	6.5	1.075	Oblong	White	White	3.3	3.3
Redsen "C"	254.3	151.3	21.6	4.7	1.058	Oblong	Red	Red	3.3	3.3
LA 12-59	251.7	132.9	21.3	4.5	1.078	Round	Red	Red	3.0	3.0
Viking	247.8	207.2	86.5	7.5	1.060	Oblong	Red	Red	3.3	3.3
NDTX 9-1068-11 R	244.9	188.4	60.7	5.7	1.057	Oblong	Red	Red	3.7	3.7
Delta Gold	199.7	162.0	77.1	7.2	1.073	Oblong	White	White	3.0	3.0
Atlantic	189.1	70.0	2.3	2.9	1.063	Oblong	White	White	2.3	2.3
Redsen "B"	188.1	93.9	0.0	4.9	1.062	Oblong	Red	Red	3.0	3.0
Denali #19	169.1	107.4	21.3	6.0	1.077	Oblong	White	White	2.3	2.3
ND 651-9	151.3	71.6	0.0	4.5	1.068	Oblong	White	White	2.3	2.3
ND 1725-4	149.4	72.0	19.7	4.3	1.072	Oblong	White	White	1.7	1.7
Red LaSoda	141.7	128.4	52.6	7.6	1.059	Oblong	Red	Red	3.3	3.3
NY 81	130.7	86.2	9.4	5.5	1.074	Oblong	White	White	2.3	2.3
TXA 17-1	117.8	97.1	53.6	5.8	1.070	Oblong	White	White	2.7	2.7
ND 860-2	91.0	58.1	2.6	5.3	1.069	Oblong	White	White	2.0	2.0
Average	226.2	156.1	50.0	5.8	1.067				2.9	
L.S.D. (.05)	155.7	137.7	64.4	2.9						

1 / 1 = very poor to 5 = excellent

Texas Table 3. Total yield, yield of U.S. No. 1 potatoes, average tuber weight, specific gravity, tuber type, skin type and general rating of 5 Norgold Russet strains, as well as regular Norgold Russet, grown at Springlake, Texas - 1989.

Variety or Selection	U.S. No. 1		CWT/A	Average		Skin Type 1/	General Rating 1/
	TOTAL YIELD CWT/A	Over 10 oz.	Tuber Weight in oz.	Specific Gravity	Tuber Type		
	Total Yield CWT/A						
Norgold "M"	259.9	180.4	31.5	3.7	1.061	Oblong	Russet
Norgold #19	253.9	190.1	35.7	3.4	1.065	Oblong	Russet
Norgold #40	250.4	168.8	26.6	4.0	1.065	Oblong	Russet
Norgold #11	214.6	145.7	18.7	5.2	1.063	Oblong	Russet
Norgold #35	211.0	141.5	26.1	3.5	1.063	Oblong	Russet
Norgold Russet	190.1	94.9	18.1	3.9	1.062	Oblong	Russet
Average	230.0	153.5	26.1	3.9	1.063		3.1
L.S.D. (.05)	129.7	103.2	32.6	7.2			

1/ 1 = very poor to 5 = excellent

Texas Table 4. Total yield, yield of U.S. No. 1 potatoes, average tuber weight, specific gravity, tuber type, skin type and general rating of 21 Idaho-Texas and Texas advanced selections (Texas seed) and 3 check varieties grown at Springlake, Texas - 1989.

Variety or Selection	TOTAL YIELD CWT/A	U.S. NO. 1 CWT/A	Average			Skin Type	General Rating 1/
			Total Yield CWT/A	Over 10 oz. in oz.	Specific Gravity	Tuber Type	
TX 6-1229-2 Ru	449.8	408.8	215.9	3.5	1.064	Oblong	Russet
ATX 6-84388-2 Ru	400.4	286.5	81.3	5.5	1.070	Oblong	Russet
ATX 6-84377-2 Ru	333.0	173.6	21.9	0.0	1.069	Oblong	Russet
ATX 6-84378-1 Ru	317.8	268.1	77.1	0.0	1.067	Oblong	Russet
ATX 6-84026-1 Ru	274.9	151.3	25.8	0.0	1.064	Oblong	Russet
Viking	270.4	204.9	74.9	8.4	1.064	Oblong	Red
Red LaSoda	264.9	185.2	37.1	4.5	1.064	Oblong	Red
Norgold "M"	260.1	152.3	40.0	1.6	1.065	Oblong	Russet
TX 6-1247-1 P	259.4	219.1	99.7	0.0	1.062	Oblong	Purple
TX 6-1253-3 W	257.2	210.7	89.1	0.0	1.071	Oblong	White
ATX 6-84165-2 Ru	250.4	135.2	23.6	0.0	1.059	Oblong	Russet
TX 6-1229-6 W	242.0	207.2	76.1	9.0	1.056	Oblong	White
ATX 6-84026-2 Ru	237.5	122.3	19.0	0.0	1.067	Oblong	Russet
TX 6-1260-1 W	230.7	197.5	95.8	1.9	1.051	Oblong	White
ATX 6-84650-4 R	198.8	112.6	6.1	0.0	1.068	Oblong	Red
ATX 6-84017-2 Ru	186.8	94.9	0.0	0.0	1.062	Oblong	Russet
TX 6-1231-1 W	182.3	149.7	84.9	9.4	1.066	Oblong	White
ATX 6-84706-2 Ru	175.5	100.3	47.1	3.2	1.064	Oblong	Russet
ATX 6-84510-2 Ru	162.3	117.5	24.8	4.8	1.065	Oblong	Russet
ATX 6-84448-1 Ru	149.1	66.8	5.8	0.0	1.062	Oblong	Russet
ATX 6-84069-3 Ru	141.3	82.0	6.8	3.2	1.063	Oblong	Russet
ATX 6-84516-1 Ru	114.9	93.6	31.3	0.0	1.066	Oblong	Russet
Average	242.5	172.3	57.3	2.5	1.063		3.0
L.S.D. (.05)	92.4	81.2	59.8	8.5			

1/ 1 = very poor to 5 = excellent

Texas Table 5. Total yield, yield of U.S. No. 1 potatoes, average tuber weight, specific gravity, tuber type, skin type and general rating of 12 potato varieties or advanced selections grown in a strip trial at Springlake, Texas - 1989.

Variety or Selection	U.S. No.1 CWT/A			Average Tuber Weight in oz.			Specific Gravity	Tuber Type	Skin Type	General Rating 1/
	TOTAL YIELD	Total Yield	Over 10 oz.							
Norgold #40	438.4	300.4	58.1	5.9	1.069	Oblong	Russet	3.0		
NDTX 9-1068-11 R	401.3	303.9	70.2	5.9	1.061	Oblong	Red	4.0		
Russet Norkotah	386.4	298.7	68.3	6.4	1.071	Oblong	Russet	3.5		
A 74212-1	383.3	223.3	14.0	4.8	1.075	Oblong	Russet	3.2		
Norgold "M"	347.5	245.8	41.0	5.5	1.059	Oblong	Russet	3.6		
Krantz	320.7	240.1	39.9	6.0	1.067	Oblong	Russet	3.5		
Viking	314.7	261.1	96.1	6.9	1.062	Oblong	Red	3.0		
Red LaSoda	303.8	250.5	82.9	6.8	1.062	Oblong	Red	3.5		
Sangre	289.4	106.9	0.0	3.2	1.062	Oblong	Red	2.0		
NDTX 9-1069-4 Ru	247.9	107.5	7.4	4.0	1.058	Oblong	Russet	3.0		
Russet Nugget	239.7	164.8	12.3	4.8	1.078	Oblong	Russet	2.5		
Hilite	235.2	109.7	1.3	4.3	1.060	Oblong	Russet	2.0		
Average	325.7	217.7	41.0	5.4	1.065			3.1		
L.S.D. (.05)	58.3	57.2	26.6	0.7						

1/ 1 = very poor to 5 = excellent

VIRGINIA

S. B. Sterrett and C. P. Savage, Jr.

The germplasm evaluations focus on the identification of cultivars that are adapted to growing conditions in eastern Virginia and meet the needs of the fresh market and/or chipping industry. Replicated yield trials included 35 round white, 6 red-skinned, and 11 russeted cultivars or advanced numbered clones.

Method

Trials were planted in single-row plots, 25 feet long, on a Bojac sandy loam on April 13. Trials were planted in a randomized complete block design with four replications. Fertilization included 100 lbs N, 43.7 lbs P, and 83 lbs K/A banded at planting, with 50 lbs N sidedressed 67 days after planting. Linuron (0.38 lb ai/A) + Metolachlor (1.25 lbs ai/A) was applied at dragoff. Trials were harvested July 24. Specific gravity was determined by the weight-in-air, weight-in-water method.

Seasonal Observations

An exceptionally wet spring delayed planting by nearly 4 weeks. Except for May, rainfall exceeded the 49-year average for each month of the 1989 potato growing season. High soil moisture levels and the short growing season (102 days vs 117 days in 1988) accounted, in part, for the lower yields and substantially lower specific gravity of most clones in 1989.

Promising Clones

In the chip trial, the highest yields were noted for Atlantic, B9792-157, B0178-34, F100-1, and LA01-38. Of these, both B0178-34 and F100-1 combined exceptional chip color with specific gravity equal to that of Atlantic. The clone F100-1 was also free of internal and external defects. Although the chip color of B9792-157 was acceptable, specific gravity was as low as that of Superior. Chip color of LA01-38 was marginal while second growth was excessive. Because of the short growing season in 1989, additional evaluation of these clones is needed.

Steuben continues to be a promising main season, fresh market clone for this growing area. As in previous years, chip color of Steuben was acceptable only in the first sample (2-3 days after harvest). While the specific gravity of Denali, B0175-20, and B0256-1 exceeded that of Atlantic, yield was lower in the advanced round-white trial. Since the yield of Superior (the standard for this trial) was also low, additional testing of these clones is warranted. With high yields and attractive tubers, additional evaluation of the fresh market potential of B0257-9 is also needed. Marginal chip color would limit the chip potential of this clone.

Of the russeted clones, B0045-6, B0186-1, and B0348-1 combined acceptable tuber conformation with improved yield of BelRus. However, size distribution, particularly percentage of tubers > 8 oz., continues to be a problem in this growing area.

While the best tuber conformation and bright red skin was found with Redgold, the highest yield was recorded for Reddale. However, some growth cracks were noted for both culti-vars, with severe sunburn or greening noted for Reddale.

Internal heat necrosis (IHN) was recorded in 60-65% of Atlantic tubers (2-1/2 - 3-1/4" diameter). However, most tubers would not be considered off-grade because of internal defects (rating \geq 7.0). Internal heat necrosis was not a significant problem in commercial plantings in this growing area in 1989. The percentage of tubers with IHN in E55-35, NEA219-70-3, AF1203, B0243-3, B0303-30, B0348-1, and B0471-3 was excessive and would preclude the need for additional evaluation of these advanced numbered selections in eastern Virginia.

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Virginia Table 1. Yield and size distribution of clone with chip potential - 1989.

Clone 1 /	Total Yield cwt/A	Marketable Yield 2 /			% of Standard			% of Total Yield 3 /			Specific Gravity	Agtron	Chip Color 4 / Days after Harvest		
		cwt/A	cwt/A	% of Standard	1	2	3	4	1	2			2	9	14
Atlantic (Std)	273	230	100	14	17	60	9		1.073	57.1			2	2	4
Norchip	211	140	61	25	48	3		1.059	66.7			3	3	7	
Superior	250	209	91	14	54	14		1.061	-			4	5	6	
B9792-157	271	232	101	14	53	19		1.059	64.4			3	2	3	
B9792-158	247	186	76	23	26	47	4		1.059	-		3	2	5	
B0172-15	211	174	76	8	10	45	37	1.057	-			4	7	9	
B0178-34	256	208	90	15	16	60	9	1.076	71.1			2	3	2	
B0209-1	201	178	77	11	13	44	32	1.062	-			3	4	3	
E55-27	269	202	88	24	25	46	5	1.068	65.8			3	3	2	
E55-35	198	153	67	23	23	55	0	1.070	63.7			3	3	2	
E57-13	254	210	91	17	18	49	16	1.063	61.8			2	2	4	
F100-1	247	211	92	12	16	64	8	1.072	65.9			2	2	2	
LA01-38	263	230	100	9	10	58	23	1.057	65.5			4	5	8	
NEA219-70-3	156	127	55	16	15	51	19	1.052	65.1			3	3	6	
NY78	198	161	70	20	25	46	9	1.051	62.8			5	3	7	
Waller-Duncan	39	42													
K = 100															

1/ Planted April 13, harvested 103 days after planting.

2/ Excludes tubers with external defects or diameter < 1-7/8".

3/ Size distribution: 1 = 1-1/2" to 1-7/8", 2 = > 1-7/8" to 2-1/2", 3 = > 2-1/2" to 3-1/4", 4 = > 3-1/4". Tubers with external defects included in calculations.

4/ Unreplicated samples, 1-4 = Acceptable, 5 = Marginal, 6 or above = Unacceptable.

Virginia Table 2. Yield and size distribution of advanced round white clones - 1989.

Clone 1/	Total Yield cwt/A	Marketable Yield 2/ % of Standard		% of Total Yield 3/ 1 2 3 4				Specific Gravity	Agtron	Chip Color 4/ Days after Harvest		
		cwt/A	Standard	16	19	54	12			2	4	7
Atlantic	244	202	262	16	19	54	12	1.066	60.2	2	4	7
Denali	138	111	144	21	18	53	9	1.075	-	-	-	-
La Chipper	232	169	219	20	21	52	7	1.058	59.5	5	3	7
Steuben	249	206	268	14	16	49	21	1.064	53.5	3	6	6
Superior (Std)	106	77	100	24	20	49	7	1.062	-	4	7	8
AK3-79-209-81	112	65	84	26	32	42	1	1.060	-	-	-	-
AK5-76-168-79	74	46	60	32	24	42	3	1.065	-	-	-	-
AF1094-19	178	99	129	44	29	27	0	1.056	-	-	-	-
AF1161-1	181	113	147	29	30	36	5	1.048	-	-	-	-
AF1203-5	171	107	139	32	30	36	2	1.068	65.6	-	-	-
B9955-46	195	156	203	17	21	58	4	1.063	-	2	3	5
B0169-56	162	55	71	41	37	21	1	1.068	-	-	-	-
B0175-20	200	113	147	28	32	36	4	1.073	-	-	-	-
B0209-1	173	147	191	8	10	51	31	1.067	64.6	3	3	5
B0237-6	204	152	197	23	22	49	6	1.060	68.6	4	3	3
B0242-3	264	212	275	12	16	60	12	1.068	64.0	3	6	5
B0256-1	227	176	229	21	20	51	9	1.074	64.5	3	5	8
B0257-3	245	169	219	29	27	42	2	1.069	60.3	3	3	6
B0257-9	226	191	248	12	14	64	11	1.063	60.3	4	5	5
B0303-11	74	17	22	67	21	12	0	1.066	-	-	-	-
Waller-Duncan (K = 100)		58	54									

1/ Planted April 13, harvested 103 days after planting.

2/ Excludes tubers with external defects or diameter < 1-7/8".

3/ Size distribution: 1 = 1-1/2" to 1-7/8", 2 = > 1-7/8" to 2-1/2", 3 = > 2-1/2" to 3-1/4", 4 = > 3-1/4". Tubers with external defects included in calculation.

4/ Unreplicated samples, 1-4 = Acceptable, 5 = Marginal, 6 or above = Unacceptable.

Virginia Table 3. Yield and size distribution of russet clones - 1989.

Clone	1/ cwt/A	Total Yield			Marketable Yield			2/ % of Total Yield			3/ % of Total Yield			4/ Specific Gravity		
		cwt/A	cwt/A	Standard	Advanced	Trial	1	2	3	4	5					
Be1Rus (Std)	150	71	100	36	42	20	2	1	1	1.065						
Coastal	138	70	99	34	46	20	0	0	0	1.050						
B0045-6	249	180	254	26	44	28	2	0	0	1.063						
B0186-1	233	169	238	22	40	31	5	2	2	1.066						
B0303-30	204	111	185	33	40	23	3	1	1	1.065						
B0329-10	133	64	90	40	42	13	4	1	1	1.069						
B0338-2	130	58	82	44	42	10	1	2	2	1.059						
B0345-11	125	53	45	49	41	9	1	0	0	1.064						
B0348-1	235	176	248	21	40	28	9	1	1	1.059						
B0372-12	209	111	156	40	39	18	3	0	0	1.064						
B0471-3	175	111	156	25	44	27	3	1	1	1.056						
Walker-Duncan (K = 100)	48	43														

1/ Planted April 13, harvested 103 days after planting.

2/ Excludes tubers with external defects or diameter < 1-7/8".

3/ Size distribution: 1 = tubers < 4 oz., 2 = 4-8 oz., 3 = 8-12 oz., 4 = 12-16 oz., and 5 = > 16 oz. Tubers with external defects included in calculation.

Virginia Table 4. Yield and size distribution of red-skinned clones - 1989.

Clone ^{1/}	Total Yield cwt/A	Marketable Yield ^{2/}			% of Total Yield ^{3/}			Specific Gravity	Chip Color ^{4/}		
		cwt/A	% of Standard	1	2	3	4		1	3	7
LaRouge	200	146	107	21	25	51	4	1.057	-	-	-
Norland	231	181	133	16	25	52	6	1.055	-	-	-
Reddale	236	184	135	15	13	51	20	1.054	7	7	-
Redgold	191	137	101	25	25	46	4	1.068	-	-	-
Red Pontiac (Std)	201	136	100	21	23	52	3	1.049	-	-	-
Sangre	105	49	36	36	30	34	0	1.054	-	-	-
Waller Duncan (K = 100)		67	56								

1/ Planted April 13, harvested 102 days after planting.

2/ Excludes tubers with external defects or diameter < 1-7/8 inches.

3/ Size distribution: 1 = 1-1/2" to 1-7/8", 2 = > 1-7/8" to 2-1/2", 3 = > 2-1/2" to 3-1/4", 4 = > 3-1/4". Tubers with external defects were not included in calculation.

4/ Unreplicated samples, 1-4 = Acceptable, 5 = Marginal, 6 or above = Unacceptable.

Virginia Table 5. Tuber characteristics and defects - 1989.

Clone	Maturity	Vine Rating 1/	Tuber Rating 1/			Sun- burn	Second Growth	Defects 2/		
			Pollution	Shape	Appear- ance			Maturity	Growth	
<hr/>										
Atlantic (Std)	6	7	2	7	5	9	9	9	13	6
Norchip	6	6	3	4	6	9	9	9	1	8
Superior	5	9	4	7	7	9	9	9	0	9
B9792-157	6	8	2	6	5	9	7	9	0	9
B9792-158	6	8	4	5	5	9	8	9	2	8
B0172-15	8	8	5	4	5	9	9	9	4	7
B0178-34	8	9	3	6	6	9	9	9	2	8
B0209-1	7	9	3	6	7	9	8	9	0	9
E55-27	5	8	4	6	7	9	9	9	0	9
E55-35	7	7	2	6	6	9	9	9	8	8
E57-13	6	8	3	6	6	9	9	9	0	9
F100-1	7	8	3	6	5	9	9	9	0	9
LA01-38	7	9	4	5	5	9	5	9	0	9
NEA219-70-3	6	8	3	5	6	9	7	9	5	8
NY78	6	6	2	6	7	9	9	9	0	9
<hr/>										
Atlantic	6	6	2	7	5	9	8	9	12	7
Denali	9	8	3	5	7	9	7	9	0	9
La Chipper	6	7	3	6	5	6	6	9	0	9
Steuben	7	6	3	7	5	9	8	8	2	7
Superior (Std)	5	7	4	5	8	6	8	9	0	9
AK3-79-209-81	7	5	6	5	5	9	8	9	5	8
AK5-76-168-79	9	9	4	5	5	9	5	9	2	8
AF1094-19	5	7	2	6	7	9	5	9	1	8
AF1161-1	9	9	4	6	5	9	5	9	0	9
AF1203-5	6	8	3	6	7	9	7	9	10	7
B9955-46	5	8	3	6	5	6	6	9	0	9
B0169-56	8	8	3	5	5	5	5	9	0	9
B0175-20	5	7	3	4	4	5	5	9	0	9
B0209-1	5	5	4	7	3	6	6	6	3	7
B0237-6	5	8	3	6	7	9	6	6	6	6
B0242-3	5	8	4	6	6	7	9	9	0	9
B0256-1	8	8	3	6	7	9	7	9	0	9
B0257-3	6	8	2	7	8	9	6	6	0	9
B0257-9	5	8	4	6	6	9	6	6	0	9
B0303-11	5	5	3	4	4	5	5	9	1	8

Virginia Table 5. Tuber characteristics and defects - 1989. (continued)

Clone	Vine Rating 1/			Tuber Rating 1/			Defects 2/		
	Maturity	Pollution	Shape	Appearance	Skin	Sunburn	Second Growth	Growth Cracks	# Necrosis Rating
Russetted Trial									
Be1Rus (Std)	7	5	7	5	5	9	5	9	3
Coastal	7	7	7	5	5	9	5	9	1
B0045-6	6	8	6	6	6	8	8	9	1
B0186-1	6	8	6	4	5	6	9	6	1
B0303-30	5	7	6	6	5	9	6	9	7
B0329-10	5	8	7	5	4	6	6	9	0
B0338-2	5	4	7	4	5	9	7	6	0
BP345-11	3	6	7	4	5	9	9	9	1
B0348-1	6	6	6	6	6	9	9	9	8
B0372-12	5	7	6	4	5	6	9	6	4
B0471-3	5	7	6	4	4	9	7	9	8
Red-skinned Trial									
LaRouge	7	8	3	5	6	9	5	9	0
Norland	3	6	2	6	7	9	6	9	3
Reddale	6	6	2	6	6	3	9	6	0
Redgold	4	7	2	7	7	9	9	7	1
Red Pontiac (Std)	8	9	4	5	5	9	6	6	0
Sangre	6	8	3	4	6	9	2	9	4

1/ Vine maturity: 1 = Senesced, 9 = Totally green. Air pollution: 1 = Defoliated, 9 = No visible symptoms. Shape: 1 = Round, 5 = Oblong, 9 = Very long (cylindrical). Size: 1 = Very small, 9 = Very large. Appearance: 1 = Very poor, 9 = Excellent. Skin maturity: 1 = Totally peeled during harvest and grading, 9 = Skin intact.

2/ Defects: 1 = Severe, 9 = None. Ratings of heat necrosis made on 20 tubers in the size range 2-1/2" to 3-1/4". Ratings of heat necrosis made on 20 tubers in the size range

WISCONSIN

R.E. Hanneman, Jr., D.M. Spooner, and J.B. Bamberg

Genetics, Cytogenetics and Biosystematics of the Tuber-bearing Solanum Species. (Cooperative USDA, ARS and Wisconsin Agricultural Experiment Station).

Results of selection for a correlation between seedling and tuberling performance

Selection for many varietal traits at the seedling stage has been shown to be relatively ineffective. An experiment was devised comparing the tuber characteristics of seedlings (plants derived from seeds) and tuberlings (plants derived from first generation tubers), to determine if populations could be selected in which the seedling performance of the best tuberlings was improved. This would help to prevent the discarding of potentially valuable clones in early generations. A population including five cultivar parents was synthesized. Seedling clones and their tuberlings were ranked by making a composite of scores for total yield, proportion of large tubers, uniformity of tuber size and tuber shape. Clones in the top 20% in the tuberling evaluations were divided into two groups to be used as parents. The "high" group was composed of the clones which had relatively high ranking seedlings in the previous year, and the "low" group composed of clones which had relatively low ranking seedlings. The populations which resulted from this separation had the following characteristics: as seedlings, the "low" group had had significantly lower scores than the high group for all parameters except proportion of large tubers, while as tuberlings, the only significant difference had been greater total yield in the high group. This means that the division of the base population into two groups of parents by virtue of seedling performance only discriminated the tuberlings with respect to total yield -- i.e. the only significant relationship between seedling and tuberling performance in the base population involved total yield.

High and low selected parents were intermated, and a balanced bulk of seeds was produced. These two populations were grown and evaluated as seedlings, and subsequently as tuberlings. The relationships between seedling and tuberling scores were analyzed for each of the four parameters for the top 20% of the tuberlings of the high and low populations. Only the correlations of seedling - tuberling total yield scores were significantly different between the high and low populations. This is not too surprising since the yield scores between seedlings and tuberlings were already correlated in the base population ($r = 0.38$). However, the seedling-tuberling yield correlation was significantly depressed by negative selection in the "low" population ($r = 0.09$), and was increased by positive selection in the "high" population ($r = 0.62$) with 90% confidence.

The data of other workers indicate that relationship between seedling and tuberling performance is typically poor, but varies among families. This suggests a genetic component to the relationship between seedlings and tuberlings. Indeed, the results given here indicate that one cycle of selection can significantly change the correlation between seedling and tuberling yields of clones which receive high scores in the tuberling generation. The magnitude and significance of this gain would presumably have been greater if the seedling-tuberling correlation of the base population had been poorer. We conclude that it is possible to select for improved seedling-tuberling correlation such that the hazard of discarding poor yielding seedlings with good potential is reduced.

Chile, 1989 potato collection expedition

A joint Chile, United States potato (Solanum sect. Petota) germplasm collecting expedition was conducted in the southern half of Chile from January 21-March 30, 1989, with funds provided by the USDA, ARS. The participants of the trip were Prof. Andres Contreras from the Universidad Austral de Chile and David Spooner from IR-1. Prof. Contreras was key to the success of this expedition. He has collected extensively in Chile, and many of the collecting localities were previously discovered by him.

The goals of this expedition were to collect Solanum brevidens and S. etuberosum (ser. Etuberosa), S. maglia (ser. Maglia), and S. tuberosum ssp. tuberosum (ser. Tuberosa), and to gain preliminary data for an eventual taxonomic revision of ser. Etuberosa. The germplasm collected is listed in Table 1.

Wisconsin, Table 1. Summary of collections of Solanum sect. Petota from the 1989 Chile trip

Series	Species	No. of Collections			Altitude in meters
		Seeds	Tubers ¹	Rhizomes ²	
<u>Etuberosa</u>	<u>Solanum brevidens</u>	39	15	45	40-1170
	<u>S. etuberosum</u>	23	7	25	500-2245
<u>Maglia</u>	<u>S. maglia</u>	0	3	4	10-20
<u>Tuberosa</u>	<u>S. tuberosum</u>	1	24	2	0-10
	TOTALS	63	49	76	

¹ S. tuberosum

² ser. Etuberosa

Solanum etuberosum grows in areas of dry shrubby vegetation, along water seeps and streamsides, generally in full sun, from latitude 33°S to 39°S at elevations of 500-3000m. The species was located in most areas of suitable habitat where it was sought, but populations are widely spread apart, and collecting was most efficiently accomplished on horseback. Fruiting times vary among populations, but best collecting of fruits would be accomplished during January and February.

Solanum brevidens is morphologically very similar to S. etuberosum. It grows in areas of shaded mature forests, in full sun or deep shade, from latitude 35°S -42°S, at elevations of 0-1250m. Although many populations are found in sunny areas, along seeps and streamsides as S. etuberosum, many other populations are found in shaded habitats in rich organic soils. Solanum brevidens is much more common than S. etuberosum, and collecting was most efficiently conducted by truck and foot. Fruiting times also vary but best collecting of fruits would be accomplished during February-mid March. Preliminary field data indicate that some currently-recognized species in S. ser. Etuberosa likely are synonyms of other species. These include S. palustre (=S. brevidens) and S. subandinum (=S. etuberosum).

Solanum maglia grows most commonly in the scattered seepage areas facing the Pacific Coast, from latitude 30°S-33°S. All populations encountered lacked fruits, but tubers were collected. The range of most efficient collecting times is unknown.

Solanum tuberosum ssp. tuberosum is indigenous to Chiloe Island and the Islands of the Chonos Archipelago south of Chiloe Island. All of the populations encountered were land races maintained as specialty crops and novelties on small farms on Chiloe Island. An extensive diversity of tuber types was encountered. Tubers would most effectively be collected during March.

Reinvestigations of diploid hybridization of Solanum michoacanum and S. raphanifolium (Solanum sect. Petota) - data from 5S nuclear ribosomal DNA repeat lengths

Recent work with genetically more precise isozyme and DNA characters have provided new insights into hybridization hypotheses, with some being supported, and others questioned or rejected. Molecular data also has indicated hybridization where it previously has not been suspected.

The wild and cultivated tuber-bearing Solanums (Solanum sect. Petota) represent a group where introgression and hybrid speciation have been hypothesized to have occurred at the diploid, tetraploid, and hexaploid levels. This study utilized 5S nuclear ribosomal DNA (5S nrDNA) to reinvestigate two hybrid speciation hypotheses: S. michoacanum, mch (= S. bulbocastanum, blb X S. pinnatisectum, pnt), and S. raphanifolium, rap (= S. canasense, can X S. megistacrolobum, mga). It is an extension of earlier studies on these species utilizing chloroplast DNA and 18S-28S nuclear ribosomal DNA.

Analyzed were: can (PI 210035, 230511, 246533, 265863, 265864, 265875, 283074, 283080, 283084, 310940, 458375, 458377, 442696, 473345, 473346, 473347, 473355); mga (210034, 310978, 435072, 458346, 458348, 473109, 473118, 473121, 473128, 473137, 473146, 473159, 473356, 473360, 473362, 498257, 498258, 498259, 498263, 500031); rap (265862, 310953, 310998, 458382, 458406, 473370, 473465, 473466, 473502, 473526, 246539 X 210048, 290944 X 246539): in addition to S. toralapanum, tor (195210, 458396, 472804, 472806, 472807, 472808, 473389, 498144, 498145, 498146), this latter species believed to be closely related, and possibly conspecific with mga. Additionally, 5S nrDNA was examined for artificial interspecific hybrids of:

can 265875 X rap 473466	(6 individuals)
mga 210034 X can 310940	(1 grouped sample of 2 individuals)
mga 275148 X can 310938	(10 individuals)
mga 275148 X can 310939	(1 grouped sample of 5 individuals)
mga 275148 X can 310941	(1 grouped sample of 6 individuals)
rap 263086 X can 265865	(3 individuals)
rap 473466 X mga 265873	(5 individuals)

Total DNA was digested with Bam H1, followed by electrophoresis and southern transfer to nylon membranes. The membranes were probed with a heterologous 5S nrDNA probe from Zea mays L. (courtesy of Elizabeth Zimmer, Louisiana State University). A typical ladder-like pattern of monomer, dimer, and multimer repeats resulted due to random modification of Bam H1 sites by methylation. All rap were characterized by a single repeat size of 360 kb, and most can, mga, and tor were characterized by a single repeat size of 390 kb. One accession of can, one of mga, and four of tor had one or two additional minor bands of 330 or 380 kb. The artificial hybrids, as expected, combined the bands of the parental species, and all bands were present within individuals. These results correlate with prior data from chloroplast DNA and 18S-25S nrDNA in indicating the non-hybrid and divergent status of rap in relation to can and mga, and provide unambiguous evidence refuting this hybridization hypothesis.

Parallel studies were conducted with blb, mch and pnt. Ten individual plants from two separate populations of mch (Spooner 4177), separated by 200 m were analyzed, in addition to two populations of blb (PI 243504, 275200) and four of pnt (186554, 275230, 275234, 347766). 5S repeat lengths of all mch and pnt were 400kb, and those of blb varied from 320-360kb. The lack of additivity in the mch accessions fails to support an hypothesis of its hybrid origin.

Development of RFLP markers for the hybrid between a self-compatible Solanum chacoense line & S. phureja

To initiate an RFLP assisted breeding program, RFLP markers have been developed. Approximately 900 random genomic DNA clones, having one (or two) 0.6-2.0 kbp EcoRI fragment from S. phureja (clone 1.22), were isolated using pUC19 plasmid and E. coli strain DH5 α . Out of them, approximately 300 clones were selected as low-copy DNA clones. These were Southern-hybridized with EcoRI and HindIII digests of total DNA from a self-compatible S. chacoense line (chc 525-3), S. phureja (1.22) and 15 hybrids. One hundred and thirty clones provided polymorphic markers between parents and heterozygously maintained in a particular clone (F₁-1).

This F₁-1 clone will be crossed with one of the good FDR 2x tuberosum clones to generate a segregating population to map RFLP markers and other traits such as an S-locus inhibitor gene, non-tuber-dormancy, yield, etc.

RFLP analysis of Solanum acaule

The highly heterozygous nature and lower degree of genome differentiation make it difficult to differentiate species within the tuber-bearing Solanums. Particularly for the South American species, both chloroplast DNA and peroxidase isozymes failed to differentiate not only the species, but even the taxonomic series. Restriction Fragment Length Polymorphism's (RFLP's) can be useful, since a different level of resolution can be selected by using different DNA probes. Very conservative, or genome specific, RFLP markers were selected in the Brassica species, while very variable RFLP markers, which are polymorphic between individuals, have been selected for mapping studies. However, the usefulness of RFLP's for phylogenetic studies has not been demonstrated in the tuber-bearing Solanum species. In this initial study, the highly homozygous tetraploid, S. acaule, was chosen to show the usefulness of RFLP's for taxonomic studies at the species and subspecies level.

One hundred-five accessions of S. acaule were selected throughout distribution area, including all subspecies (i.e., ssp. albicans (6x), ssp. punae, ssp. acaule and ssp. aemulans). Twenty-seven low-copy DNA clones (probes) were Southern-hybridized with EcoRI, EcoRV, HindIII and XbaI digests of total DNA of all accessions (Table 2). Out of 27 probes, 22 probes (or 45 of 94 probe X enzyme combinations) provided ssp. albicans specific fragments or patterns. This finding may be useful to trace the origin of the third genome of ssp. albicans. Solanum acaule ssp. aemulans from the Prov. of La Rioja (the type locality) is well-distinguished by 10 probes, whereas ssp. punae could not be distinguished from ssp. acaule. The taxonomic status of ssp. aemulans from the Prov. of Jujuy is questionable. RFLP data differentiated these Jujuy populations from other populations of ssp. aemulans. Detailed analysis within and between subspecies is still under investigation. In conclusion, an RFLP analysis is a useful tool to disclose subspecies specificity of S. acaule.

Wisconsin, Table 2. RFLP's of Solanum acaule

Probe	<u>EcoRI</u>	<u>EcoRV</u>	<u>HindIII</u>	<u>XbaI</u>
P10	N	N	N	N
P43	V	(L-aem)	(alb) (L-aem)	(alb)
P122	V	J-aem	V	V
P135	(alb)	(alb) (L-aem)	(alb)	alb
P140	alb	V	alb, L-aem	alb
P159	N	alb, J-aem	alb	--
P209	L-aem	(L-aem)	alb, L-aem	L-aem
P215	alb	alb	(alb)	(alb)
P247	N	V	V	V
P256	V	V	alb, L-aem	--
P278	N	N	(alb)	N
P279	L-aem	(alb) (L-aem)	(alb)	V
P292	alb, J-aem, L-aem	alb, J-aem	V	--
P298	V	V	alb, L-aem	alb
P304b	alb	--	V	--
P307	V	V	V	V
P352	alb	--	alb, J&L-aem	--
P368	N	alb	N	V
P374	N	N	V	--
P392	N	V	(alb)	alb
P403	V	--	(alb)	--
P417	(alb)	(alb)	(alb)	(alb)
P434	V	--	(alb) (L-aem)	--
P473	(alb)	(alb)	V	V
P477a	alb	--	alb	--
P562	V	alb	alb	alb
P648	(alb)	L-aem	(alb) (L-aem)	V

-: Not analyzed

N: No variation

V: Polymorphic

If a specific polymorphism was found only but common in a certain taxon, it is designated as follows:

alb (=ssp. *albicans*)

J-aem (=ssp. *aemulans* from the Prov. of Jujuy)

L-aem (=ssp. *aemulans* from the Prov. of La Rioja)

If polymorphisms were found only in the designated taxon or taxa, it is shown in brackets.

The possible next step would be to demonstrate the usefulness of an RFLP analysis for the heterozygous species.

A potential role for EBN regulation of isoprenoid metabolism

Little is known about the processes regulated by the genes which dictate a species' EBN. This situation is in part due to the difficulty of extracting the endosperm from the relatively small seed of the tuber-bearing Solanum species. However, a testable hypothesis concerning the function of the EBN genes has been derived by considering terminal embryo development as an internal assay for endosperm performance.

The following characteristics of terminal embryo development following inter-EBN matings in the tuber-bearing Solanum species were used to derive this hypothesis: 1) the embryo cells were highly vacuolate, 2) the embryos had no dermatogen, 3) the embryos had no cotyledons or cotyledonary initials, and 4) the embryos had no epicotyl. In turn, these characteristics make a circumstantial case for a hormonal imbalance.

Based on the fact that in vitro organogenesis can be regulated through the cytokinin to auxin ratio, it would seem reasonable that the lack of differentiation of the embryo could have similar roots. However, the paucity of cytoplasm in the highly vacuolate embryo cells making up the embryo suggests that the cause is more basic.

Helpful in this regard is an assessment in the literature of the cytoplasmic content of similarly-appearing embryos in 2x x 4x crosses in Hybiscus. Here it was observed, among other things, that the cells of hybrid embryos had fewer ribosomes and less endoplasmic reticulum than the cells of the control embryos. Further, the ribosomes in the control embryo cells existed chiefly as polysomes. These circumstances suggest that GA, ABA, or both, may be involved.

This speculation is based on the reported effects that these two hormones have on excised barley aleurone layers during the lag period between their application and the appearance of hydrolytic enzymes. According to researchers studying this lag period, GA stimulates monoribosome formation, polyribosome formation, and the percentage of ribosomes existing as polyribosomes, as well as stimulating increases in the amount of endoplasmic reticulum. When ABA is added at the same time as GA, it negates these increases, even when the molar concentration of GA is four times that of the ABA. It is also interesting to note that the early stages of biosynthesis of GA and ABA involve isoprenoid metabolism.

The hypothesis derived from this circumstantial evidence is that the EBN genes regulate isoprenoid metabolism, and that an imbalance in the EBN genes causes an imbalance in the regulation of the isoprenoid pathway. This is an attractive

USDA, ARS personnel changes in relation to IR-1

hypothesis in that the hormones derived from this pathway can act in the same tissue in which they are produced, as well as in remote locations. Because of this, it is possible that imbalance in this pathway could be the root cause of endosperm failure as well as embryo failure.

Dr. J.B. Bamberg was appointed USDA, ARS Geneticist (Curator, IR-1 Project Leader) in June, 1989. In this capacity, Dr. Bamberg has assumed all IR-1 project responsibilities formerly assigned to Dr. R.E. Hanneman, Jr. with Dr. Hanneman retaining oversight responsibility. Dr. Bamberg's position is primarily one of service (80%), with a 20% research function. Dr. Hanneman has been directed to expand his research efforts to include the start of an enhancement program utilizing 2n gametes, EBN and haploids. Dr. D.M. Spooner's responsibilities have not changed in this restructuring of responsibilities.

Thoughts on the new enhancement program

The intent of this program is to begin the incorporation of the traits screened for in the IR-1 collection and given high priority by the Potato Crop Advisory Committee. The principle focus will be on the wild species and the approach will encompass the use of 2n gametes, EBN, haploids, and other appropriate breeding stocks and approaches. The intent is to provide advanced parental materials to be released to breeding programs. The program is envisioned to engage the cooperation of other state, federal and industry programs. Assistance will be needed in setting joint goals, securing appropriate parental materials, screening and evaluating progeny and extensive testing of advanced parental materials. Because of present funding restrictions, there will be little or no funding available from the enhancement project to accomplish these goals, unlike what was once envisioned. This makes cooperation even more crucial in reaching mutual goals. This enhancement effort will require the identification of key breeding programs around the U.S. that would like to take advantage of this program in an active way and to have materials designed for their specific needs. It will require a sincere commitment on the part of the breeding programs involved - perhaps requiring the growing of 5,000-10,000 seedlings per year as well as time spent on evaluation and selection of superior materials. There will be costs associated with it that the cooperating program will have to bear. There will have to be a view that the generated material can and will be helpful to the breeding program and will provide materials that the program otherwise would not be able to develop. It is envisioned that as the program develops that parental material will be available to other breeding programs, not otherwise able to make a commitment to this effort. The enhancement program is seeking breeding programs willing to make a serious commitment to this effort.



